Community Participation Scoping Project, for the Acharya Jagadish Chandra Bose Botanical Gardens, Kolkata, India, 2020-2021

Neeta Das (NSDA, Indian Partner to the CPSP)

Dorian Wiszniewski (UoE)

Jane Burridge (AST, UK Partner to the CPSP)

ESALA
Edinburgh School of Architecture & Landscape Architecture

THE UNIVERSITY of EDINBURGH
Edinburgh College of Art

About the Authors:

Neeta Das is a graduate in Architecture from CEPT, Indiaand a post graduate in Architectural History, Criticism, & Pedagogy,from DAAP, USA. She has done her Ph.D. from SPA Delhi/ Lucknow University and specialises in conservation. Das has authored and co-authored several books on the 18th and 19th century architectural history and their conservation. With a teaching career of three decades, she is currently a visiting faculty at CEPT, India. Based in Kolkata, Das practices as a conservation architect and her work emphasises the holistic and sustainable conservation of old buildings and urban precincts by helping re-align them with the mainstream systems and developments.

Dorian Wiszniewski is a senior academic in Edinburgh School of Architecture and Landscape Architecture (ESALA), University of Edinburgh, and partner in Wiszniewski Thomson Architects. Built and project work have been published and exhibited nationally and internationally. In ESALA he is Director for M Sc Architectural and Urban Design and PhD Architecture By Design. Academic outputs have been published widely internationally. His specialist area is the Theory and Practice of Architectural and Urban Design, through what he calls Ecosophic Urbanism.

Jane Burridge is Development Director of the Asia Scotland Trust and an Architect and University studio tutor. She has been in senior management roles for over twenty years and as a partner of SHS BURRIDGE Architects her expertise is in critical analysis & planning, liaising closely with clients to formulate briefs and achieve the aspirations of user groups. In recent years she has focused on projects in the Public & 3rd sector to realise the social outcome requirements of project funders. She has a particular skillset advising Charitable Development Trusts, is a Consultant to SKS Scotland developing sustainable social businessesand is a Board member of Gorebridge Community Development Trust.

Source of Illustrations:

- *All drawings within the sections of each intern are produced by the interns. If referencing historical documents, they have been retrieved from the archives of the AJC Bose Botanical Gardens.*
- *All drawings within the section of the AUDA Academy are produced by tutors and students in the AUDA Academy.*
- *All photographs in the report have been taken by the participating members of the program.*
- *Other photographs and drawings have been duly credited within.*

© copyright CC-BY-SA

This report is offerd under a creative comons license by Share Alike

You are free to:

Share — copy and redistribute the material in any medium or format
Adapt — remix, transform, and build upon the material for any purpose, even commercially.

The licensor cannot revoke these freedoms as long as you follow the license terms

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.

No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

Notices:

You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation.

No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material.

Community Participation Scoping Project, for the Acharya Jagadish Chandra Bose Botanical Gardens, Kolkata, India

Neeta Das
Neeta Shubhrajit Das Associates, Kolkata, India (Indian Partner)
Vision, Content, and Principal Author

Dorian Wiszniewski
Senior academic representing the University of Edinburgh, Scotland
Principal Investigator to the CPSP

Jane Burridge
Development Director, Asia Scotland Trust, Edinburgh, Scotland (UK Partner)

2020-2021

The University of Edinburgh would like to thank all the partners, collaborators, and participants of the project including: A. A. Mao, Kanad Das, Sita Ram Panda, Basant Singh, Neeta Das, Dorian Wiszniewski, Jane Burridge, Navpreet Arora, Debayan Chatterjee and all AUDA members, Rajeev Saurastri, S. Vishwanath, Rajat Ray, Lata Bajoria, Shahanshah Mirza, Anne Buddle, Mark Watson, Rosie Llewellyn-Jones, Suchismita Bhattacharya, Biplab Mukherjee, Antara Ghosh, Gina Reddie, Gowri Seshagiri, Susan Falconer, Clare Sorensen, Achirava Raha, Mahasweta Roy, Ahindra nath Datta, Arabinda Singha Roy, Anjana Das, Tania Das, Sushmita Mandal, Yash Sharma, Anurupa Roy, Ishita Das, Susmita Paul.

আচার্য্য জগদীশ চন্দ্র বোস
(৩০ নভেম্বর,১৮৫৮-২৩ নভেম্বর,১৯৩৭)
১৭৮৭ সালে প্রতিষ্ঠিত
এই ভারতীয় উদ্ভিদ উদ্যানের
২০০৯ সালে নাম রাখা হয়
"আচার্য্য জগদীশ চন্দ্র বোস ভারতীয় উদ্ভিদ উদ্যান"
ডা. এ.এ. মাও
মাননীয় নির্দেশক
ভারতীয় বনস্পতি সর্বেক্ষণ
পরিবেশ,বন এবং জলবায়ু পরিবর্তন মন্ত্রালয়
ভারত সরকার

Monument to A.J.C. Bose, after whom the garden is named

Contents

001 Message, A. A. Mao

003 Foreword, Rosie Llewellyn-Jones

005 Introduction, Dorian Wiszniewski

009 Overview, Neeta Das
- Funonstreets
- Internship Program
- AUDAcademy Workshop

023 Findings of Interns
- Achirava Raha
- Arabinda Singha Roy
- Mahasweta Roy
- Ahindra Nath Dutta
- Tania Das
- Susmita Paul
- Anurupa Roy
- Sushmita Mondal
- Yash Sharma
- Anjana Das
- AUDAcademy

089 Condition Survey & Interpretations, Neeta Das

104 Funding Prospects, Jane Burridge

108 Conclusion & Way Forward, Dorian Wiszniewski

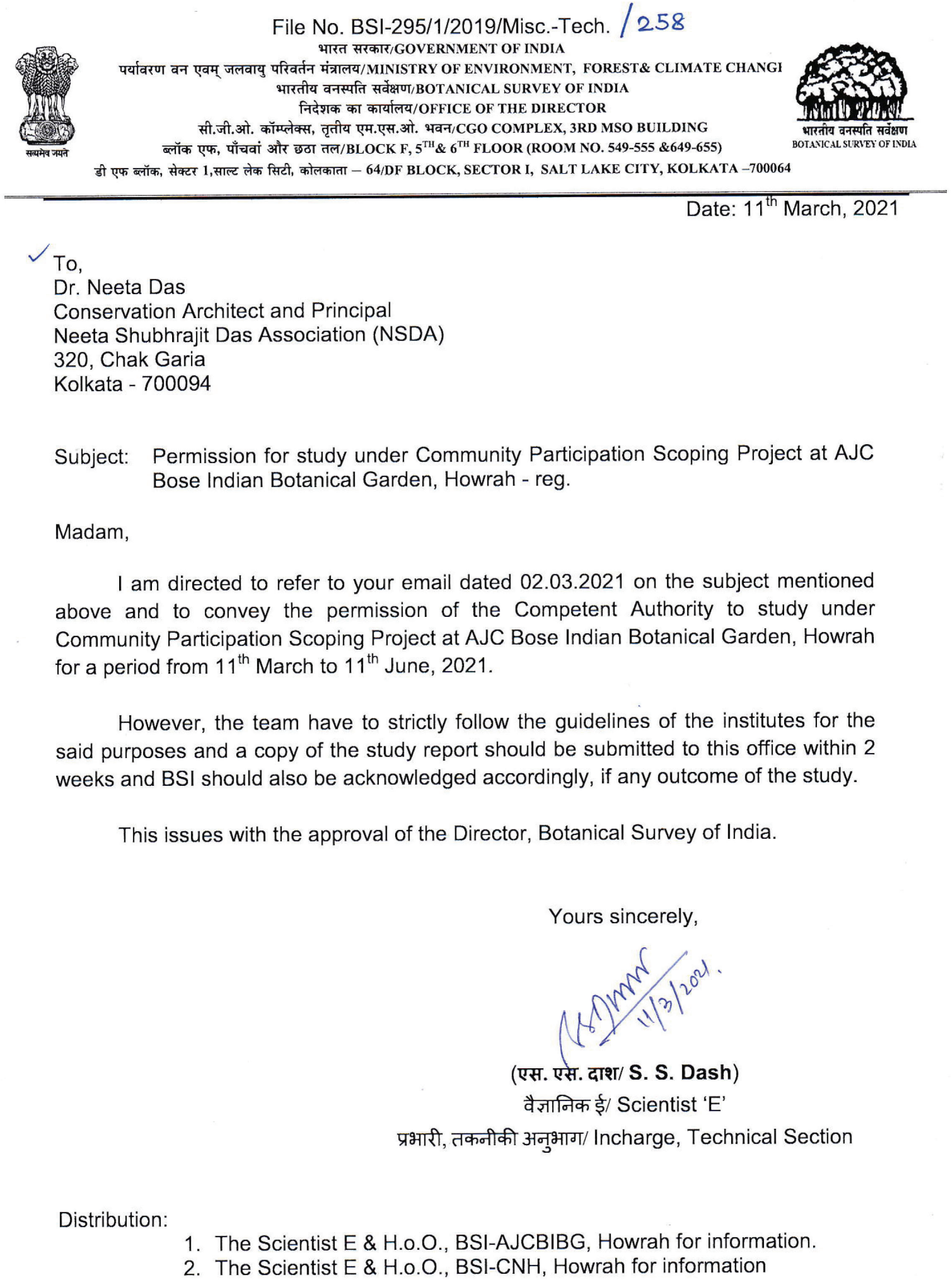
114 Afterword, Mark Watson

Appendix 1 Internship Reports
Appendix 2 AUDA Report

Top Right: Source: BSI Library.

Left: Current view of the Avenue of Palms.

Message



File No. BSI-295/1/2019/Misc.-Tech. /258

भारत सरकार/GOVERNMENT OF INDIA
पर्यावरण वन एवम् जलवायु परिवर्तन मंत्रालय/MINISTRY OF ENVIRONMENT, FOREST& CLIMATE CHANGI
भारतीय वनस्पति सर्वेक्षण/BOTANICAL SURVEY OF INDIA
निदेशक का कार्यालय/OFFICE OF THE DIRECTOR
सी.जी.ओ. कॉम्प्लेक्स, तृतीय एम.एस.ओ. भवन/CGO COMPLEX, 3RD MSO BUILDING
ब्लॉक एफ, पाँचवां और छठा तल/BLOCK F, 5TH & 6TH FLOOR (ROOM NO. 549-555 &649-655)
डी एफ ब्लॉक, सेक्टर 1,साल्ट लेक सिटी, कोलकाता – 64/DF BLOCK, SECTOR I, SALT LAKE CITY, KOLKATA –700064

Date: 11th March, 2021

✓ To,
Dr. Neeta Das
Conservation Architect and Principal
Neeta Shubhrajit Das Association (NSDA)
320, Chak Garia
Kolkata - 700094

Subject: Permission for study under Community Participation Scoping Project at AJC Bose Indian Botanical Garden, Howrah - reg.

Madam,

I am directed to refer to your email dated 02.03.2021 on the subject mentioned above and to convey the permission of the Competent Authority to study under Community Participation Scoping Project at AJC Bose Indian Botanical Garden, Howrah for a period from 11th March to 11th June, 2021.

However, the team have to strictly follow the guidelines of the institutes for the said purposes and a copy of the study report should be submitted to this office within 2 weeks and BSI should also be acknowledged accordingly, if any outcome of the study.

This issues with the approval of the Director, Botanical Survey of India.

Yours sincerely,

11/3/2021.

(एस. एस. दाश/ **S. S. Dash**)
वैज्ञानिक ई/ Scientist 'E'
प्रभारी, तकनीकी अनुभाग/ Incharge, Technical Section

Distribution:

1. The Scientist E & H.o.O., BSI-AJCBIBG, Howrah for information.
2. The Scientist E & H.o.O., BSI-CNH, Howrah for information

Permission letter for the project by B.S.I.

BSI director, A.A.Mao welcomed the rejuvenation study but warned that "such study will remain in documents and files for lack of funds to implement it." "Our budget in 2019-20 was Rs. 76 crores, in 2020-21, it has been slashed to Rs. 64 crores. About 80 percent of the budget is spent on salaries. What development work can be undertaken in such little money?" The director stressed on involving corporates, availing CSR funds and finding other avenues of finance to rejuvenate the garden. (As told to The Telegraph, Kolkata on 3rd July, 2021, see overleaf on page 4)

The Baobab tree got recognition among children by its depiction in "The Little Prince" by Antoine de Saint-Exupery.

Foreword

During the 18th century the idea of botanic gardens spread from Europe to the East and West Indies. As trade increased and larger ships travelled around the Cape of Good Hope to and from India and beyond, botanic specimens became part of the cargo. It was realised that plants could be exploited for medicinal and commercial use, as well as their nutritious or decorative value.

The Calcutta Botanic Garden established in 1787 by Colonel Robert Kyd of the East India Company's Bengal Engineers, was at the forefront of experiments with new shrubs and trees brought from abroad. The Garden cultivated tea bushes imported from China; cinchona (quinine-producing) trees from south America, and cinnamon trees from Ceylon. Kyd emphasized that the Garden was not only there to nourish rare plants but also to develop those that would benefit the people of India. He had seen the devastation caused by the Bengal famine of 1769-1771 and the later Chalisa famine of 1783 and he believed that the promotion of new crop varieties would help to avert future calamities – the awful desolation caused by 'famine and subsequent pestilence' as he described it.So there was a strong humanitarian argument for the creation of the Garden, as well as good commercial reasons.

Allied to these were Kyd's own beliefs, strengthened by the Enlightenment ideas coming from England and France. These led, among other things, to a new appreciation of flora and fauna, and the desire to find, identify and classify plants, animals and birds. The Swedish botanist Carl Linnaeus, systemised the naming of plants with unique identifications which are used worldwide today. Unusually for his time, and his community, Kyd wished to be cremated, with no religious ceremonies, and his ashes to be scattered in the Garden. This was such a shocking idea that his wishes were ignored. He was buried in South Park Street cemetery, but commemorated in the Garden with a handsome urn. There was also a 'Cenotaph Wall' that bore his name and those of two other young botanists: the explorer William Griffith who had donated plants gathered in Afghanistan and Dr William Jack, plant collector and author.

Surprisingly the first experiments in India with the electric telegraph were carried out in the Garden in 1839 by WilliamO' Shaughnessy, secretary of the Asiatic Society of Bengal, with the help of Dr Nathaniel Wallich, the Garden Superintendent. 42 rows of bamboo stakes, each 15 feet tall, were driven into the ground. Between them were strung wires coated with tar. The entire circuit, round and round the Garden, measured 22 miles and an electric current was generated through it. Dr Wallich had sportingly agreed that the galvanometer could be housed in the library of his handsome house on the river side of the Garden.
The Garden has seen tragedy too. In January 1879 a Bengal tigress escaped from the menagerie of king Wajid Ali Shah, who lived on a large estate at Matiya Burj, exactly opposite the Garden and separated from it by a half-mile stretch of water. Unlike the majority of their feline cousins, Bengal tigers are skilled swimmers. The tigress, having broken out of her cage, was attracted by the lush greenery of the Garden. Having swum the Hughli, she was seen bounding into the nursery which was near the Curator's house, then crossing the Ribben Walk and padding through the mango grove into the teak avenue.

The Garden Superintendent at the time Dr George King, alerted the police and warned his staff to take cover. But the Garden's curator, Adolph Biermann, disobeyed the instructions and went looking for the animal who suddenly sprang out of a bush and attacked him. Biermann died the following year from his injuries and is buried in the adjacent campus of what was the Seebpur Engineering College (now the Indian Institute of Engineering Science and Technology).The king was heavily criticised for keeping wild animals in urban Calcutta and the unfortunate tigress was shot dead in fields surrounding the Garden.

Today, more than 230 years since it was established, the Acharya Jagadish Chandra Bose Indian Botanic Garden, is the largest in Asia. There is nothing quite like it and it lies in an unique position, with a river frontage a mile long. Among Kolkata's many handsome sites, this is a remarkable part of the city's rich heritage and an ecological treasure for today.

Dr. Rosie Llewellyn-Jones
M.B.E.
London

THE TELEGRAPH CALCUTTA SATURDAY 3 JULY 2021

XXCE

METRO

Revival plan for botanical garden

ANASUYA BASU

Indian Botanic Garden, Shibpur

Howrah: A team of professionals from fields like biodiversity specialists, botanists, landscape artists and urban developers is putting together a rejuvenation programme for the Indian Botanic Garden in Shibpur, one of the earliest botanical gardens in the world.

The University of Edinburgh along with Asia Scotland Trust and the Botanical Survey of India (BSI) is participating and funding this programme. Neeta Subhrajit Das Associates (NSDA), a Calcutta-based architecture firm and Architecture Urban Design Academy (AUDA) are the local collaborators.

A community participation scoping project (CPSP) under the rejuvenation programme was taken up by 11 selected interns from institutes such as the architecture department of Jadavpur University, BIT, Mesra, botany department of Calcutta University, CEPT, Ahmedabad and IIM, Tiruchirapalli at the botanical garden from March 13-17, 2021.

The interns have studied and documented the existing edge conditions of the garden and presented their findings in a seminar on June 2.

“The Indian Botanic Garden was laid out in Howrah but it was designed for Calcutta by an architect from Garden Reach. The revitalisation and rejuvenation programme is to put the garden under a lens and take it apart to see how it can be relevant for the present times and have a sustainable future. We have experts from various fields looking at the garden to see what should be preserved, what should be modified,” said Neeta Das, of NSDA, who is the local partner spearheading the CPSP. She along with Dorian Wiszniewski, senior academic representing the University of Edinburgh, and Jane Burridge from the Asia Scotland Trust are leading the programme.

The botanical garden in Shibpur, founded by a Scot in 1786, has maintained strong ties with Scotland. However, in recent times the 273-acre garden has been plagued by multiple issues leading to its decline as a repository of rare and endemic species.

Cyclone Amphan in 2020 has dealt a body blow to the garden and its most prized possession — the 270-year-old Great Banyan Tree — lost a considerable portion of its canopy besides a number of old and magnificent trees have also been felled.

The ongoing pandemic has played its part leading to a reduction in government funds for the garden, fewer staff and lack of qualified personnel needed to maintain it. Fungal attacks to rare species like the Double Coconut Tree and other failures have dented the garden’s reputation.

Overrun by weeds and decrepit maintenance, the garden is a pale shadow of what it used to be in its hey days.

“The CPSP is a compilation of a series of academic, documentation, and sensitisation exercises that will lead to a greater understanding of what might constitute a vision to be framed as a Regeneration and Ecological Framework Plan (REFP) for the Acharya Jagadish Chandra Bose Indian Botanic Garden, Howrah. The REFP will be available to all parties who have an interest in the revitalisation of the AJC Bose Botanical Gardens Environment,” said Wiszniewski.

BSI director A.A. Mao welcomed the rejuvenation study but warned that “such study will remain in documents and files for lack of funds to implement it”. “Our budget in 2019-20 was Rs 76 crore, in 2020-21, it has been slashed to Rs 64 crore. About 80 per cent of the budget is spent on salaries. What development work can be undertaken in such little money,” he asked.

The director stressed on involving corporates, availing CSR funds and finding other avenues of finance to rejuvenate the garden.

Introduction

Dr. Dorian Wiszniewski

The Acharya Jagadish Chandra Bose Indian Botanic Garden, Kolkata, is one of the earliest botanical gardens in the world. Originally founded by a Scot in 1786, it has maintained strong ties with Scotland throughout its history. In recent years the garden has fallen into neglect. However, recently, it has been hit not only by COVID but by the disastrous cyclone Amphlan in March 2020 which brought down hundreds of magnificent trees, adding an additional urgency to its need for regeneration. A vision to restore it is now proposed to ensure that this exceptional horticultural, scientific, heritage and cultural collection is protected for future generations.

This report is prepared as the concluding document to a project operating under an award granted through the University of Edinburgh's annual Scottish Funding Council Global Challenges Research Fund allocation. The University of Edinburgh Partnerships Fund (UoEPF) has enabled this important Community Participation Scoping Project (CPSP). It operates as a sub-project to the development of a Regeneration and Ecological Framework Plan (REFP) for the garden, endorsing a key ambition of building a 'shared future'. The REFP has a number of parties driving its formation, particularly the Asia Scotland Trust (AST). Their mission is to engage with creative projects that leave a social, environmental and economic impact and enable people to improve their quality of life. The AST have made it their mission to be responsible for developing and coordinating the REFP.

The CPSP is a distinct academic collaborative international research project involving the identification and early participation of the 'communities' of the AJC Bose Indian Botanic Garden in determining the long-term desired outcomes. It is prepared with the REFP in mind and will be made available to all interested parties. It makes its own contribution towards the REFP. Like the REFP, the CPSP encourages the revitalisation of the full garden and its environs: not only the ecology of plants and collections but also the ecology and well-being of people and communities.

The local, regional, national and international importance of the project is recognised by all current partners and is key to establishing all the different aspects of the CPSP and REFP. However, the local context is specifically challenging. Kolkata sits on one side of the Hooghly River. Howrah is a distinct city, on the other side of the Hooghly from Kolkata, also operating under the West Bengal government but under a different Metropolitan Municipality. The AJC Bose Botanical Garden sits on the Howrah side of the river but under the municipal authority of Kolkata. Therefore, there is a detachment between the amenity that the Botanic Gardens provides for Kolkata and the local communities in Howrah.

Despite the challenges of Covid-19, the CPSP has initiated research into the different communities that will benefit from the REFP. However, due to Covid it has been restricted. Nonetheless, various consultation processes were undertaken and the report can be a basis of further consultation processes. The minimum outcome of this project was to present the CPSP to the Botanical Survey of India (BSI), Kolkata, thereby, paving the way for future communications between local communities and the BSI. We were pleased to have the full cooperation of the BSI throughout the project and participation in many of the events, particularly through engagement with the interns, the work of which can be seen in other areas of this report. It is hoped that the CPSP will support the prospect of making a larger application to the Darwin Initiative Fund or other ODA compliant organisation to develop the REFP further.

The CPSP/REFP has involved and hopefully will extend many complex components with important relationships between UK and India, ranging between Indian National and Regional Government, UK and Indian Academic Partners, UK and Indian Charitable Trusts (e.g. the Asia Scotland Trust, Kolkata Scottish Heritage Trust [KSHT], Roxburgh International Hub, INTACH), UK and Indian Institutes (e.g. Royal Botanical Gardens, Edinburgh, and the Botanical Survey of India, Kolkata, British High Commission in India and Historic Environment Scotland), Local Communities in Kolkata/Howrah and local and regional Indian business interests. The CPSP and this report we hope will further promote, develop and bring the local community into these networks and vice versa.

The CPSP has benefitted from a three-way partnership and authorship:

1. The University of Edinburgh has acted as Principal Investigator, initiating and framing the precise study of the CPSP, steering the overall orientation and coordinating the funding.
2. Jane Burridge as Development Director of the Asia Scotland Trust, responsible to the UoEPF,has bridged between the CPSP and REFP. This has allowed the CPSP to develop as it needs to, feeding the work of the CPSP into the development of the REFP whilst, reciprocally, extending the CPSP through the network of the AST.

3. Neeta Das, Neeta Shubhrajit Das Associates, as Kolkata based consultant, responsible to the UoEPF, has developed the various research processes, programme of outputs and coordinated pathways to planned impacts in India. Neeta Das has developed and coordinated Indian networks and sensitisation events, particularly, connecting the UoE and BSI with a range of stakeholders from local communities, cultural organisations and academic institutions.

The partnership has produced this report, which not only records the processes we developed to identify local communities, stakeholders and the issues which affect them, the report stands to record the need to keep developing the network of stakeholders and the various means by which the community they collectively represent can be enriched. The Report contains datasets that record the research pathways of the various collaborators, particularly the interns who were guided by the partnership and participants but especially Neeta Das. My conclusion records my thoughts and frames some questions and possibilities, gathered in the course of the CPSP. Perhaps they point towards ways in which the REFP might be taken forward.

Further acknowledgements
The University of Edinburgh would like to thank all participants in this Community Participation Scoping Project, from individuals tc organisations, but particularly the BSI who facilitated access to all aspects of the gardens and who encouraged and aided the interns in their research.

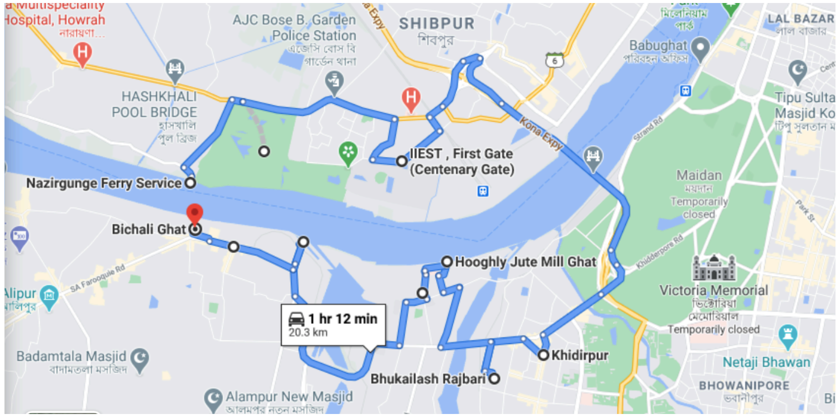
Bottom: The Kyd's Monument

THE UNIVERSITY *of* EDINBURGH
Edinburgh College of Art

Community Participation Scoping Project (CPSP)
AJC Bose Indian Botanical Garden Environment, Howrah & Kolkata
Edinburgh School of Architecture and Landscape Architecture, Edinburgh College of Art, UK

Project: Identification of key areas, issues, and institutions that directly or indirectly affect the AJC Bose Botanical Garden in and around Howrah and Kolkata

The AJC Bose Botanical Gardens, Kolkata, is one of the earliest botanical gardens in the world. Originally founded by a Scot in 1786, it has maintained strong ties with Scotland throughout its history. However, recently, it has also been hit not only by COVID but by the disastrous cyclone Amphan in March 2020, which brought down hundreds of magnificent trees, adding additional urgency to its need for regeneration.



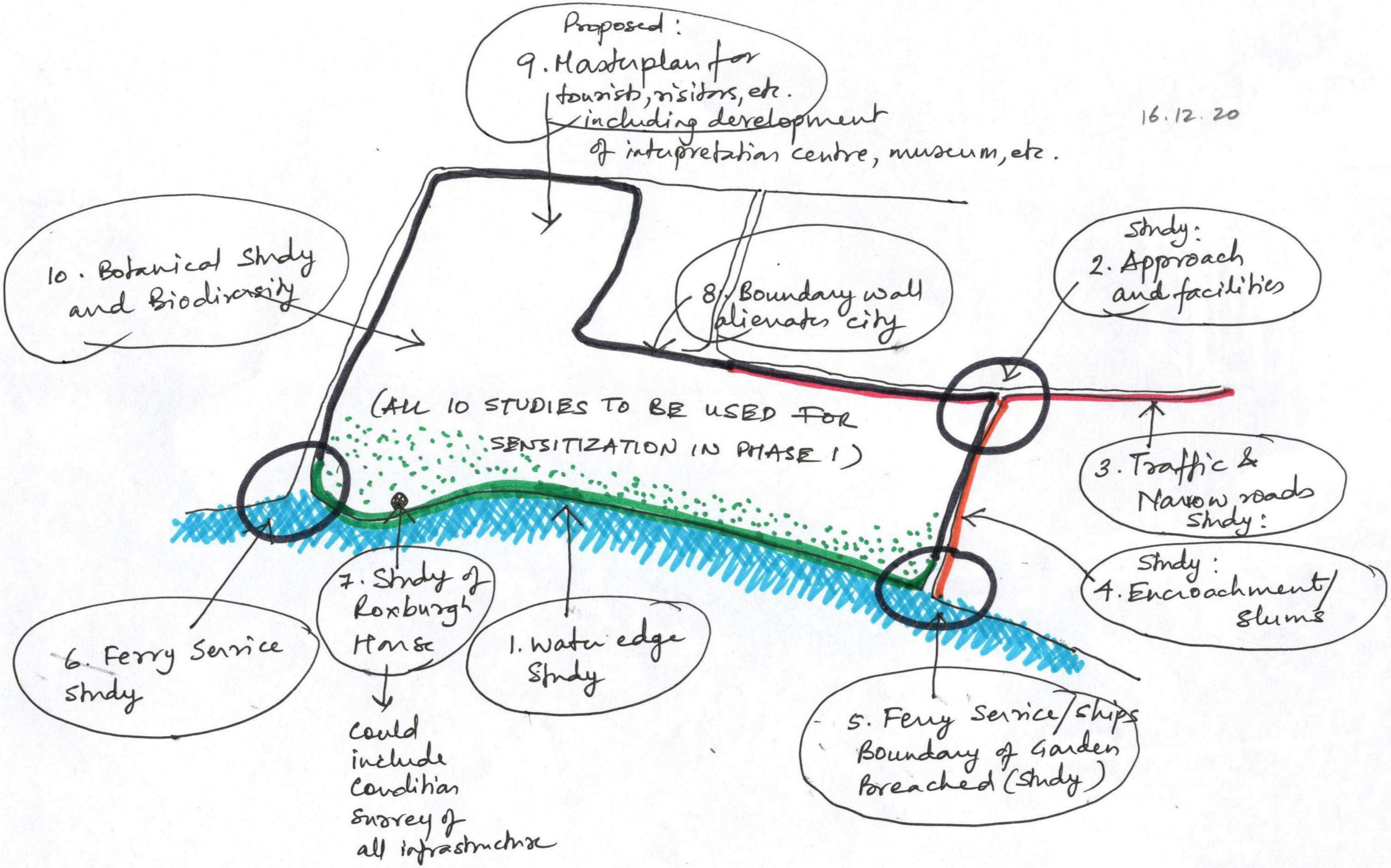
The University of Edinburgh, Scotland has undertaken a study titled, Community Participation Scoping Project (CPSP). The CPSP is seen as one compilation of a series of academic, documentation, and sensitisation exercises that will lead to a greater understanding of what might constitute a vision to be framed as a Regeneration and Ecological Framework Plan (REFP) for the Acharya Jagadish Chandra Bose Indian Botanic Garden, Howrah.
Proposed Study Area (Source: Google Map)

The current partners and respective representatives developing the project are: Dr. Dorian Wiszniewski, a senior academic representing the University of Edinburgh as the Principal Investigator to the CPSP and also a Trustee of the Asia Scotland Trust (which operates as a coordinating agency for the development of the REFP); Jane Burridge, who is Development Director of the Asia Scotland Trust, Edinburgh, Scotland, and also the coordinator of all collaborators/partners in Scotland; and Dr. Neeta Das, NSDA, Kolkata, India, who as partner to the CPSP will help develop the content and vision of the CPSP and be the coordinator of all collaborators/partners in Kolkata and India.

The CPSP is a purely academic research exercise that will result in the preparation of a Report. The Report will be available to all parties who have an interest in the revitalisation of the AJC Bose Botanical Gardens Environment.

Dr. Dorian Wiszniewski
Principal Investigator
University of Edinburgh

January 2021


16.12.20
Proposed :
9. Masterplan for tourists, visitors, etc. including development of interpretation centre, museum, etc.
10. Botanical Study and Biodiversity
8. Boundary wall alienates city
Study: 2. Approach and facilities
(ALL 10 STUDIES TO BE USED FOR SENSITIZATION IN PHASE 1)
3. Traffic & Narrow roads Study:
Study: 4. Encroachment/slums
6. Ferry Service study
7. Study of Roxburgh House
could include Condition survey of all infrastructure
1. Water edge Study
5. Ferry Service/ships Boundary of Garden breached (Study)

Overview

Dr. Neeta Das

The project was divided into three parts. The first part was to familiarise ourselves with the 'area that could influence' the Botanic Garden. This included the river, activities on both sides of the river banks, keys issues, identify stakeholders that directly or indirectly affected the well being of the garden. One needed to find connections that could add 'value' to the revitalisation of the Botanical garden in Howrah, and make it more lucrative to funders, over other similar gardens in Kolkata. The identified area was found to be very rich in Scottish Heritage. Not only was the Botanic Garden was set up by a Scot, it was intrinsically tied up to the opposite Kolkata banks where the Kidderpore docks were designed by Scots. Compounded to this the presence of a jute mill, still using Scot machinery, is of heritage value. Flanked on both sides, the Kolkata bank have the historic remnants of the first zamindars of Calcutta and the last King of Awadh. This area was studied and a heritage walk/ tour designed by FunonStreets. It was to sensitize the citizens of Kolkata, especially school teachers, about the rich heritage of the area. But the pandemic restrictions prevented this walk from taking place.

Left: Conceptual outline sketch by Neeta Das

Right: All precinets, like a fish, depend on clean and healthy medium to survive in

As we zoomed in, we found the Botanic Garden, was enclosed within a high boundary wall on three sides, and by the river on the fourth. After talking to most people it was commonly assumed that well being lay within the compound walls. However, a walk around the perimeter clearly indicated that if the ecology of the the Botanic Garden was to be healthy, we would have to engage with the world outside the boundary wall. The entry to the Botanic Garden was through a narrow and congested street. The eastern side of the garden wall was encroached and used by hutments and as a bus parking lot. The western wall was breeched in several places, even broken, and large portions of Botanic Garden and has been lost as they are now being permanently encroached. The north side of the garden is predominantly housing, the waste disposal of which finds its way into the lakes and canals of the Botanic Garden. We collaborated with AUDAcademy, whose students made a detailed study of this area and even offered some urban design solutions to address some major issues. This was the second part of the project.

The study of the Botanic Garden itself offered a challenge with myriad issues and complexities. After a preliminary discussion with the BSI Director, Dr. A. A. Mao, it was decided that young interns would be engaged to do this study. Several relevant areas were identified for study which included history, archival study, infrastructure, urban design, landscape design, social sciences, financial and general management, biodiversity, horticulture, and visual communication. Applications were invited from various schools and colleges to recommend students and/or alumni, who were below the age of 35 years, and interested in joining the two month internship program. Applications received were screened, candidates interviewed for suitability, and ten interns inducted. Each intern was to work under the guidance of an expert from among our group. Each intern did an independent study and the same was shared with the rest of the group through regular seminars and webinars. The rich and diversified findings from their study forms forms the third, and the major part of this report.

FunonStreets

Bottom: Bicali Ghat, where the last King of Awadh arrived .

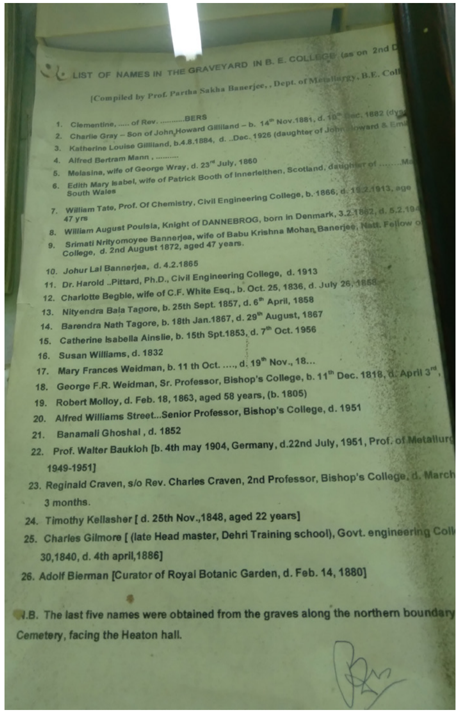
Right: Poster prepared by Fun on Streets.

Far Right: The Sibtainabad Imambara at Metia Burg.

An area intrinsically connected with the early 18th and 19th century development of *Calcutta*, albeit ignored, is the Khidderpore and the Garden Reach area. It is one of the oldest neighbourhoods of the city with the Ghoshals being the first *zamindars* to relocate here when displaced by the construction of the Fort William. The remnants of the huge Rajbari, their temples, and ponds still stand as witness to the glory of the area. The age old bridges meant to connect the Khidderpore to Garden Reach area, located right opposite the Botanical Gardens in Howrah, the jute mills dotting the banks of the Hooghly, and further down the Metai Burz area which was transformed into 'Mini Lucknow' by the exiled Nawab of Awadh, Wajid Ali Shah, makes this entire belt a microcosm of cultures replete with Indian, European, especially Scottish under currents.

The "**Garden Reach Tour**" is been organised by '**FunonStreets**' – a firm founded to bring out the multifaceted, magical, and the myriad flavours of the one and only, City of Joy, Calcutta (Kolkata), in collaboration with the University of Edinburgh, Asia Scotland Trust, and Neeta Shubhrajit Das Associates, in an attempt to unfold this forgotten precinct. Their deeply researched, as well as passionate storytelling captivates both first time visitors as well as seasoned locals and helps them see afresh and rediscover the city of Calcutta in its delightful contrasts of time warped decadence and peeling opulence, co-existing quite comfortably with the modern, whirlwind of today. We are grateful to owner of Hoogly Jute Mills, Mrs. Lata Bajoria, and direct descendant of Nawab Wajid Ali Shah, Dr. Shahnshah Mirza for their help and inputs in designing this trail.

For more details log on to https://www.funonstreets.com, https://funonstreets.com/page/walk-into-tales-of-the-city, or contact Navpreet Arora #9830374548.



LIST OF NAMES IN THE GRAVEYARD IN B. E. COLLEGE (as on 2nd D

[Compiled by Prof. Partha Sakha Banerjee, , Dept. of Metallurgy, B.E. Coll

1. Clementine, ... of Rev. ....BERS
2. Charlie Gray – Son of John Howard Gilliland – b. 14th Nov.1881, d. 10th Dec. 1882 (dy
3. Katherine Louise Gilliland, b.4.8.1884, d. ..Dec. 1926 (daughter of John Howard & Emi
4. Alfred Bertram Mann , ...
5. Melasina, wife of George Wray, d. 23rd July, 1860
6. Edith Mary Isabel, wife of Patrick Booth of Innerleithen, Scotland, daughter of ....Ma
South Wales
7. William Tate, Prof. Of Chemistry, Civil Engineering College, b. 1866, d. 19.2.1913, age
47 yrs
8. William August Poulsia, Knight of DANNEBROG, born in Denmark, 3.2.1862, d. 5.2.194
9. Srimati Nrityomoyee Bannerjea, wife of Babu Krishna Mohan Banerjee, Natt. Fellow o
College, d. 2nd August 1872, aged 47 years.
10. Johur Lal Bannerjea, d. 4.2.1865
11. Dr. Harold ..Pittard, Ph.D., Civil Engineering College, d. 1913
12. Charlotte Begbie, wife of C.F. White Esq., b. Oct. 25, 1836, d. July 26, 1858
13. Nityendra Bala Tagore, b. 25th Sept. 1857, d. 6th April, 1858
14. Barendra Nath Tagore, b. 18th Jan.1867, d. 29th August, 1867
15. Catherine Isabella Ainslie, b. 15th Spt.1853, d. 7th Oct. 1956
16. Susan Williams, d. 1832
17. Mary Frances Weidman, b. 11 th Oct. ...., d. 19th Nov., 18...
18. George F.R. Weidman, Sr. Professor, Bishop's College, b. 11th Dec. 1818, d. April 3rd,
19. Robert Molloy, d. Feb. 18, 1863, aged 58 years, (b. 1805)
20. Alfred Williams Street...Senior Professor, Bishop's College, d. 1951
21. Banamali Ghoshal , d. 1852
22. Prof. Walter Baukloh [b. 4th may 1904, Germany, d.22nd July, 1951, Prof. of Metallurg
1949-1951]
23. Reginald Craven, s/o Rev. Charles Craven, 2nd Professor, Bishop's College, d. March
3 months.
24. Timothy Kellasher [d. 25th Nov.,1848, aged 22 years]
25. Charles Gilmore [(late Head master, Dehri Training school), Govt. engineering Coll
30,1840, d. 4th april,1886]
26. Adolf Bierman [Curator of Royal Botanic Garden, d. Feb. 14, 1880]

N.B. The last five names were obtained from the graves along the northern boundary
Cemetery, facing the Heaton hall.

Far Left: Hoogly Jute Mills, Kolkata.

Top Centre Left: IIEST Campus (earlier BESU).

Top Right Left: Botanic Garden employees burried in IIEST Cemetery.

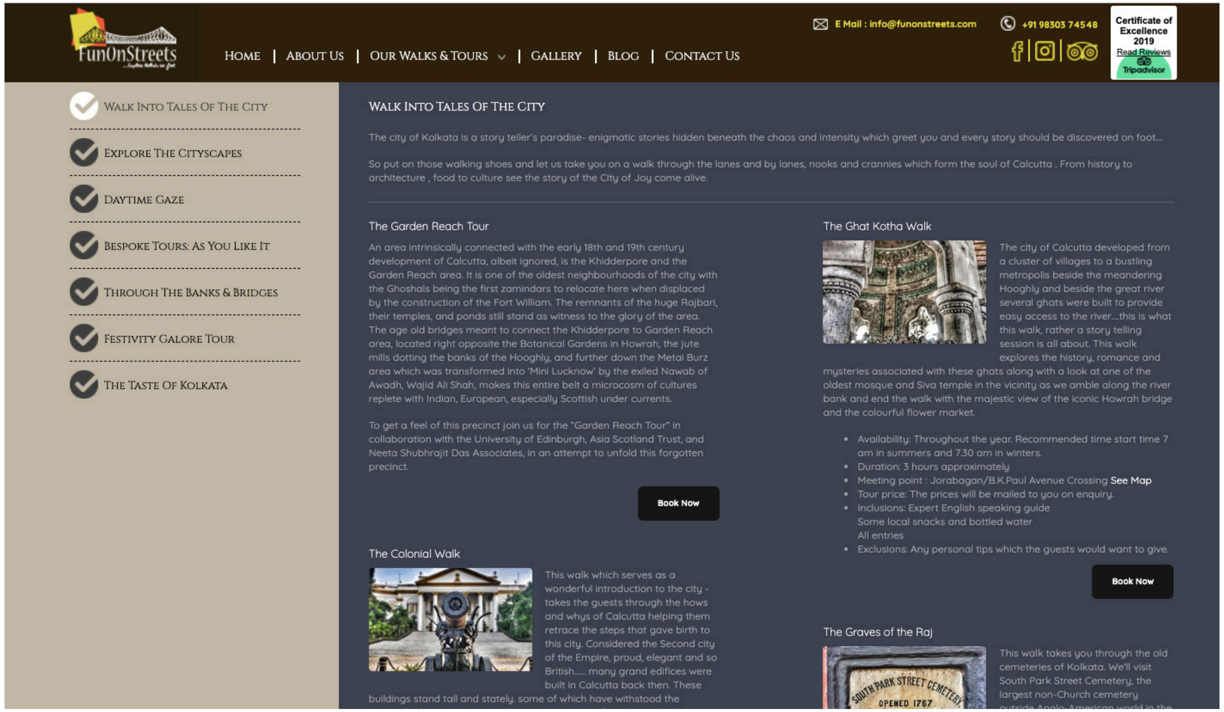
Left Bottom: Historic Structures in IIEST.

Right: Lata Bijoria, owner, Hoogly Jute Mills.

Far Right: Suriname Ghat, a monument to slavery.

Bottom Left: Fun on Streets webpage.

Bottom Right: Shahnshah Mirga, direct descendent of King of Awadh.


FunOnStreets
HOME | ABOUT US | OUR WALKS & TOURS | GALLERY | BLOG | CONTACT US
E Mail : info@funonstreets.com
+91 98303 74548
Certificate of Excellence 2019
Read Reviews
Tripadvisor
Walk Into Tales Of The City
Explore The Cityscapes
Daytime Gaze
Bespoke Tours: As You Like It
Through The Banks & Bridges
Festivity Galore Tour
The Taste Of Kolkata
Book Now
Book Now

WALK INTO TALES OF THE CITY

The city of Kolkata is a story teller's paradise- enigmatic stories hidden beneath the chaos and intensity which greet you and every story should be discovered on foot....

So put on those walking shoes and let us take you on a walk through the lanes and by lanes, nooks and crannies which form the soul of Calcutta . From history to architecture , food to culture see the story of the City of Joy come alive.

The Garden Reach Tour

An area intrinsically connected with the early 18th and 19th century development of Calcutta, albeit ignored, is the Khidderpore and the Garden Reach area. It is one of the oldest neighbourhoods of the city with the Ghoshals being the first zamindars to relocate here when displaced by the construction of the Fort William. The remnants of the huge Rajbari, their temples, and ponds still stand as witness to the glory of the area. The age old bridges meant to connect the Khidderpore to Garden Reach area, located right opposite the Botanical Gardens in Howrah, the jute mills dotting the banks of the Hooghly, and further down the Metai Burz area which was transformed into 'Mini Lucknow' by the exiled Nawab of Awadh, Wajid Ali Shah, makes this entire belt a microcosm of cultures replete with Indian, European, especially Scottish under currents.

To get a feel of this precinct join us for the "Garden Reach Tour" in collaboration with the University of Edinburgh, Asia Scotland Trust, and Neeta Shubhrajit Das Associates, in an attempt to unfold this forgotten precinct.

The Colonial Walk

This walk which serves as a wonderful introduction to the city - takes the guests through the hows and whys of Calcutta helping them retrace the steps that gave birth to this city. Considered the Second city of the Empire, proud, elegant and so British...... many grand edifices were built in Calcutta back then. These buildings stand tall and stately. some of which have withstood the

The Ghat Kotha Walk

The city of Calcutta developed from a cluster of villages to a bustling metropolis beside the meandering Hooghly and beside the great river several ghats were built to provide easy access to the river....this is what this walk, rather a story telling session is all about. This walk explores the history, romance and mysteries associated with these ghats along with a look at one of the oldest mosque and Siva temple in the vicinity as we amble along the river bank and end the walk with the majestic view of the iconic Howrah bridge and the colourful flower market.

- Availability: Throughout the year. Recommended time start time 7 am in summers and 7.30 am in winters.
- Duration: 3 hours approximately
- Meeting point : Jorabagan/B.K.Paul Avenue Crossing **See Map**
- Tour price: The prices will be mailed to you on enquiry.
- Inclusions: Expert English speaking guide
  Some local snacks and bottled water
  All entries
- Exclusions: Any personal tips which the guests would want to give.

The Graves of the Raj

This walk takes you through the old cemeteries of Kolkata. We'll visit South Park Street Cemetery, the largest non-Church cemetery

International Seminar (Internship Program)

Community Participation Scoping subproject to the **Regeneration and Ecological Framework Plan (REFP) for AJC Bose Indian Botanical Garden, Howrah**
Edinburgh School of Architecture and Landscape Architecture, Edinburgh College of Art, University of Edinburgh, UK In Partnership with
Asia Scotland Trust, Scotland
Neeta Shubhrajit Das Associates, India

Site Owners: **Botanical Survey of India**
In collaboration with **AUDAcademy** (Architecture+Urban Design) and **Fun on Streets**

2nd June 2021, 3.30 pm IST - 5.30pm IST

Basant Singh: *Sutradhaar* & Time Keeper

Kanad Das: Welcome note
Dorian Wiszniewski: Overview of Program
Neeta Das: Vision outline and methodology

Session 1: From the Archives

Achirava Raha: Historical Background since inception
Arabinda Singha: Study on the Library and Archival Materials
Mahasweta Roy: Compilation of Drawings & Documentation

Session 2: Horticulture, Water, & Biodiversity

Ahindra nath Datta: A presentation on assessment of the plants
Sushmita Paul: Linkages, Access, and Water Management System
Tania Das: Biodiversity analysis

Session 3: Human Resource & Management

Anurupa Roy: Demographic and Stakeholders Study
Sushmita Mandal: Management Plan
Yash Sharma: Revenue and Management Framework

Session 4: Design and Way Forward

Anjana Das: Landscape design for current and future use
Sreyash Dasgupta: Botanical garden and the Urban context (AUDAcademy)

Concluding Session

Jane Burridge: Rapporteur and Q & A (*Through chat box*)
A.A. Mao: Summary and Vote of Thanks
S.P. Panda: General thanks and end of seminar

Left: Details of the final webiner.

Top Left:Visit to the Library.

Top Right and Bottom: The first, and only seminar in person, for the internship program.

Left Top: Visit to the roof of the Roxburgh House.

Left Bottom: Scientist explaining the interventions to the Great Banyan Tree.

Far Right Top: The pith or stele, inside a Cycad stem.

Right Bottom: Scientists explain the importance of Cycads to the group.

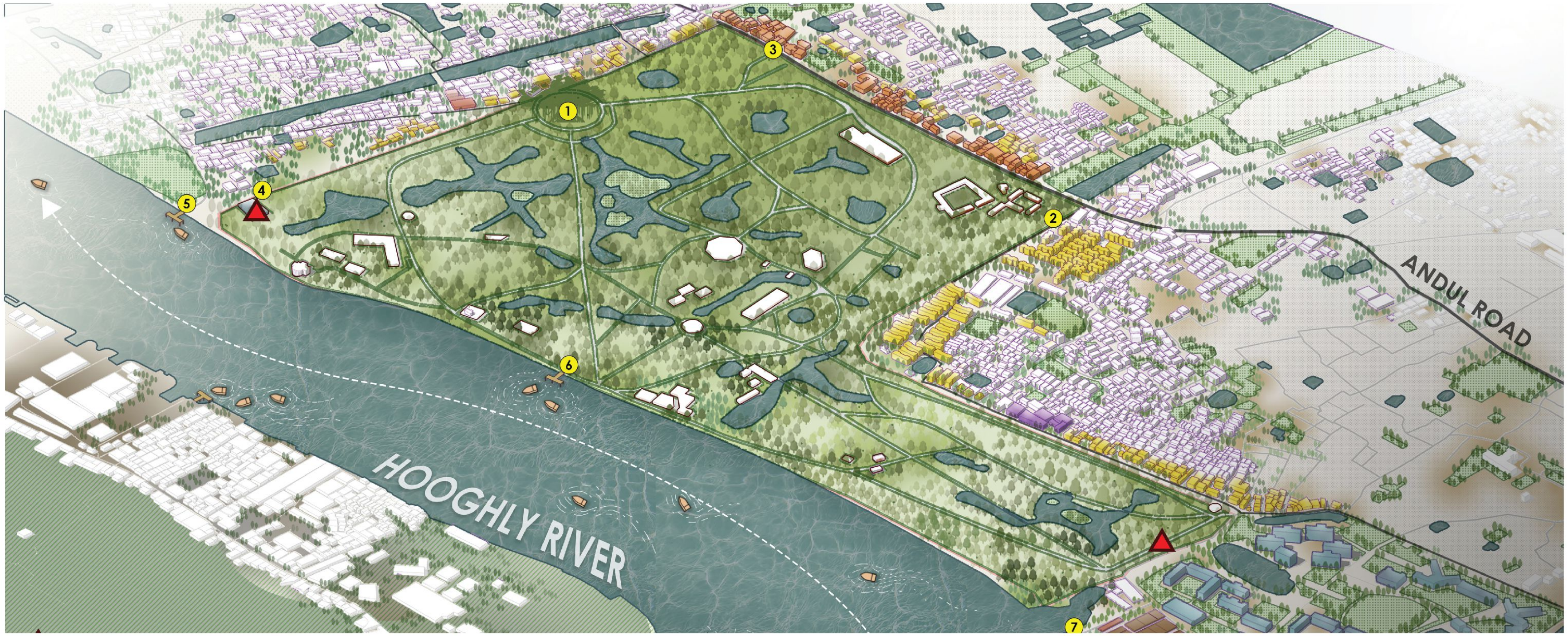
Student presentations (design ideas) on

Regeneration and Ecological Framework Plan (REFP) for AJC Bose Indian Botanic Garden, Howrah

Edinburgh School of Architecture and Landscape Architecture, Edinburgh College of Art, University of Edinburgh, UK In Partnership with
Asia Scotland Trust, Scotland
Neeta Shubhrajit Das Associates, India

Site Owners: **Botanical Survey of India**
*in collaboration with **AUDA (Architecture+ Urban Design Academy)** and **Fun on Streets***

9th June 2021
6pm IST I 8.30 am EST



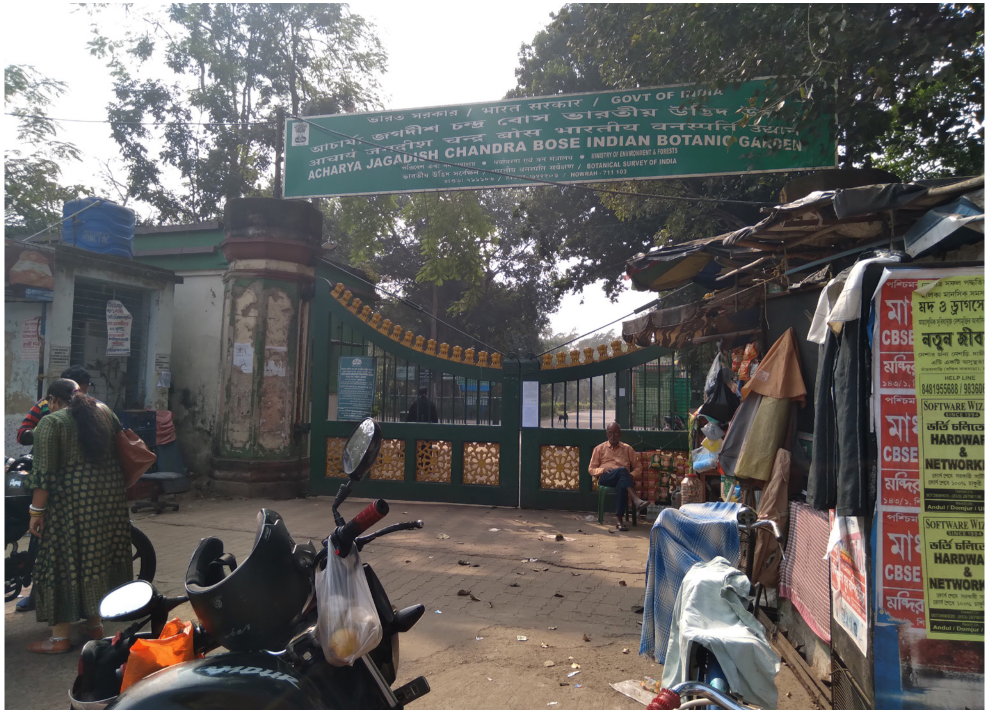
Drawing credits: Shubhajit Bagchi, Urban Designer, BDP India

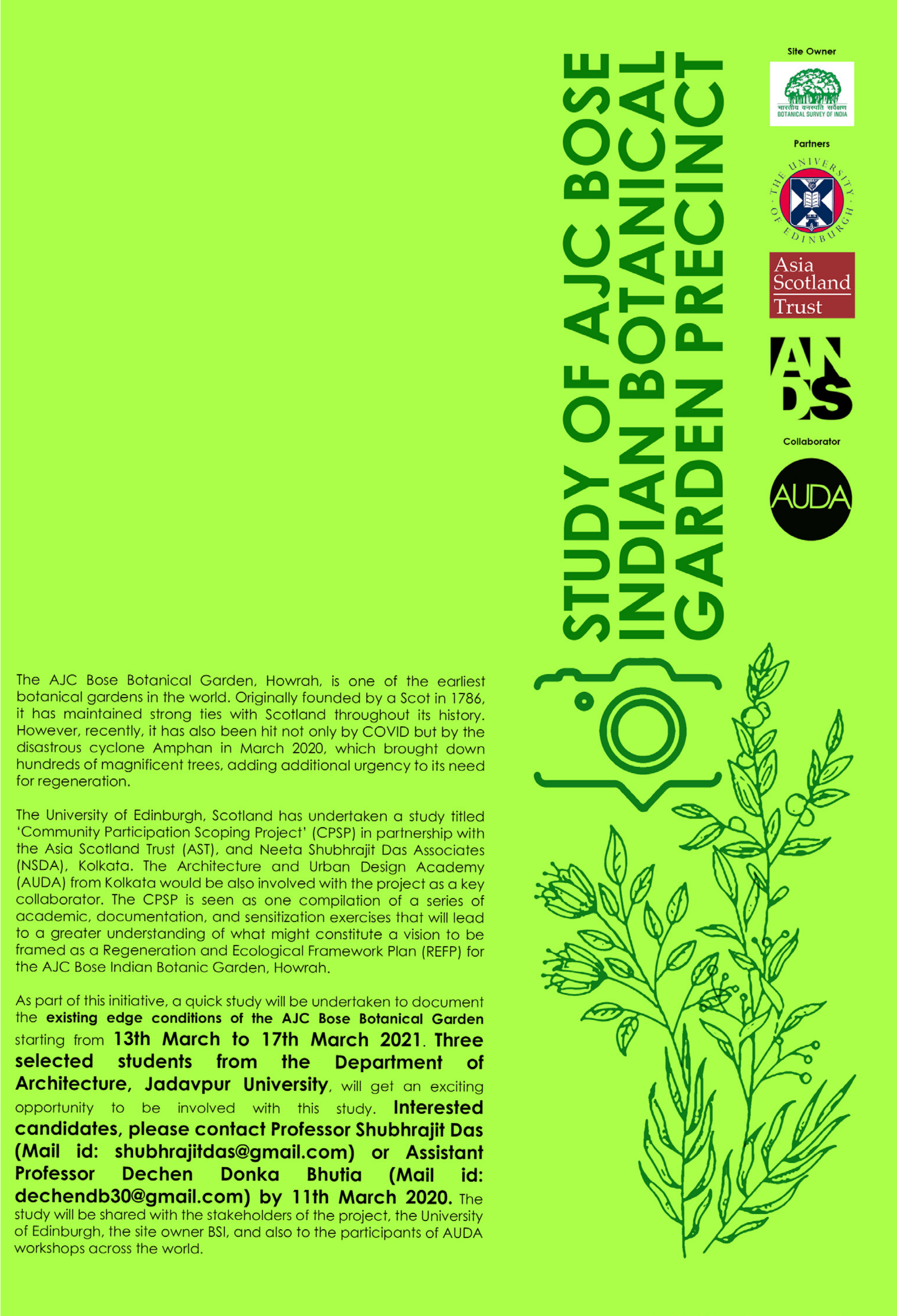
Program on next page

Left: Presentation Poster prepared by AUDA.

Bottom: Main Entry to the Botanic Garden.

Right: Flyer prepared by AUDA.


GOVT OF INDIA
ACHARYA JAGADISH CHANDRA BOSE INDIAN BOTANIC GARDEN
BOTANICAL SURVEY OF INDIA



STUDY OF AJC BOSE INDIAN BOTANICAL GARDEN PRECINCT

Site Owner

Partners

Asia Scotland Trust

Collaborator

AUDA

The AJC Bose Botanical Garden, Howrah, is one of the earliest botanical gardens in the world. Originally founded by a Scot in 1786, it has maintained strong ties with Scotland throughout its history. However, recently, it has also been hit not only by COVID but by the disastrous cyclone Amphan in March 2020, which brought down hundreds of magnificent trees, adding additional urgency to its need for regeneration.

The University of Edinburgh, Scotland has undertaken a study titled 'Community Participation Scoping Project' (CPSP) in partnership with the Asia Scotland Trust (AST), and Neeta Shubhrajit Das Associates (NSDA), Kolkata. The Architecture and Urban Design Academy (AUDA) from Kolkata would be also involved with the project as a key collaborator. The CPSP is seen as one compilation of a series of academic, documentation, and sensitization exercises that will lead to a greater understanding of what might constitute a vision to be framed as a Regeneration and Ecological Framework Plan (REFP) for the AJC Bose Indian Botanic Garden, Howrah.

As part of this initiative, a quick study will be undertaken to document the **existing edge conditions of the AJC Bose Botanical Garden** starting from **13th March to 17th March 2021**. **Three selected students from the Department of Architecture, Jadavpur University**, will get an exciting opportunity to be involved with this study. **Interested candidates, please contact Professor Shubhrajit Das (Mail id: shubhrajitdas@gmail.com) or Assistant Professor Dechen Donka Bhutia (Mail id: dechendb30@gmail.com) by 11th March 2020.** The study will be shared with the stakeholders of the project, the University of Edinburgh, the site owner BSI, and also to the participants of AUDA workshops across the world.

TheFinal list of the students who have submitted their proposals for the AJC Bose Botanical Garden project, done documentation, and their guides and teachers

Batch 9
1. Margaret Peter, SRM University, Chennai, India
2. Sergio Ramirez, Universidad Autónoma de Aguascalientes, México
3. Frithasya Jeniardina, Parahyangan Catholic University, Indonesia
4. Sneha Shinde, Rustomjee, Mumbai, India
5. Ayesha Munavar, Ramaiah Institute of Technology, Bengaluru, India
6. Pranita Varma, VNIT, India
7. Yashvi Shah, India
8. Faith Dumaligan, Studyo Akma Inc., Philippines
9. Fatima Naseri
10. Shreya S, R V College of Architecture, India
11. Anna Mariya Lukose, Calicut, India
12. Paola Herrera, UCSG, Ecuador
13. Alejandra Stigler, Universidad Peruana de Ciencias Aplicadas, Lima, Perú

Batch 10
1. Samiye Simge Duga, Sptaila Planning / TU Wien
2. Swara Bendre, Studio Space Unfold, India
3. Afrizal Maarif Imron, Wageningen University & Research, Netherlands
4. Haniek Azizie, Shirvano, Indonesia
5. Shreyas Poojary, Mumbai University, India
6. Tom Israel Carumba, University of the Philippines,Mindanao
7. Vijay Viknesh, Rajalakshmi School of Architecture, India
8. Wilda Rizkina, Shirvano Architecture and Planning, Indonesia
9. Ihanelly Hernandez, Universidad Iberoamericana de Torreón, México
10. Khalid Alemadi, ASTAD, Qatar
11. Sonia Muhammad, Politecnico di Milano, Italy
12. Serhii Ladik, Kyiv National University of Construction and Architecture, Ukraine
13. Stanley Siu, United States
14. Chui Ting Wong, Hong Kong Baptist University, Hong Kong
15. A Leena Shree Lahari, JNAFAU, India
16. Pooja Mahesh, Jawahar School of Architecture Planning and Designing, Chennai

Batch 11
1. Aditi Rajendra Pawar, T F Cube Design Studio, India
2. David Joffe, Morgan State University, Baltimore, MD
3. Hiroyuki Mak, Waseda University, Tokyo, Japan
4. Micaela Butron, University of Waterloo, Toronto, Canada
5. Namrata Sowale, Mumbai, India
6. Mackenzie Pitt
7. Padmaja Srinivasan, USA
8. Shravanthi Ds, Bangalore, India
9. Suraj Vattikuti, Vijayawada, India
10. Viktor Adartasov, Samara State University of Architecture and Civil Engineering, Russia

The list of the AUDA interns who helped us to prepare the detailed assignment brief;

Ms.Mahasweta Roy, Jadavpur University, Kolkata, Student
Ms.Devkanya Bose, Jadavpur University, Kolkata, Student
Ms.Ahina Sinha, Jadavpur University, Kolkata, Student
Ms.Tushita Basak, Jadavpur University, Kolkata, Student
Ms.Susmita Paul, IIT Roorkee, Research Associate

Mr.Shubhajit Bagchi, BDP India, Urban Designer
Ms. Bhoomika Bose, ITM University, Vadodara, India

And a list of the AUDA tutors who were involved with these batches;

Mr. Sreyash Dasgupta, Tutor, Team-AUDA
Mr. Debayan Chatterjee, Tutor, Team-AUDA
Ms. Sudeshna Sen, Tutor, Team-AUDA
Mr. Carmelo Ignaccolo, Tutor, Team-AUDA
Mr. Mario Andres Ulloa, Tutor, Team-AUDA
Mr. Huai Kuan Chung, Tutor, Team-AUDA

Program

Sreyash Dasgupta: Welcome note + Introduction to AUDA (Architecture + Urban Design Academy)
Neeta Das: Introduction to REFP
Debayan Chatterjee: Introduction to the project and brief

Student presentations (design ideas)

Session 01_Flexible Frameworks

Project 1: AUDA_B10_G01
Samiye Simge Duga, Austria I **Swara Bendre** , India

Project 2: AUDA_B11_G02
Mackenzie Pitt, USA I **Padmaja Srinivasan**, USA I **Shravanthi Ds** , India I
Suraj Vattikuti, India I **Viktor Adartasov**, Russia I

Reviewers:
Jane Burridge, Shubhrajit Das

Session 02_Garden and communities

Project 3: AUDA_B11_G01
Aditi Rajendra Pawar, India I **David Joffe**, USA I **Hiroyuki Mak**, Japan I
Micaela Butron , Canada I **Namrata Sowale**, India

Project 4: AUDA_B10_G03
Haniek Azizie, Indonesia I **Shreyas Poojary**, India I **Tom Israel Carumba,** Philippines I
Vijay Viknesh, India I **Wilda Rizkina,** Indonesia

Reviewers:
Ashiho Mao, Charles Bruce

Session 03_Active edges

Project 5: AUDA_B10_G05
Ihanelly Hernandez, Mexico I **Khalid Alemadi** , Qatar I **Sonia Muhammad**, Italy

Project 6: AUDA_B09_G01
Frithasya Jeniardina, Indonesia I **Sergio Ramirez,** Mexico

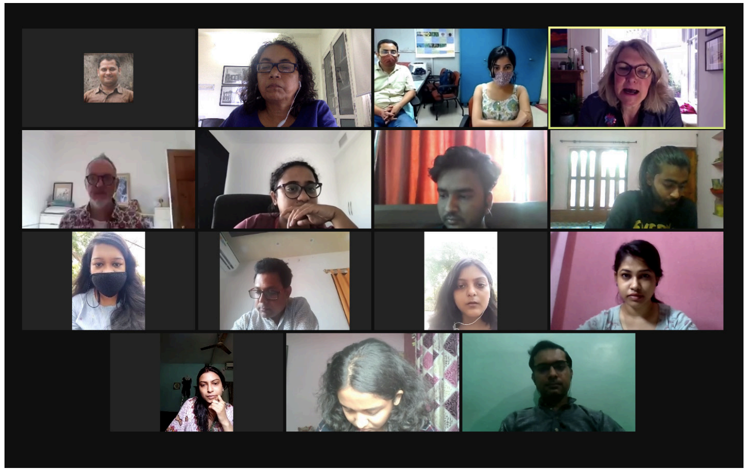
Reviewers:
Dorian Wiszniewski, Kanad Das

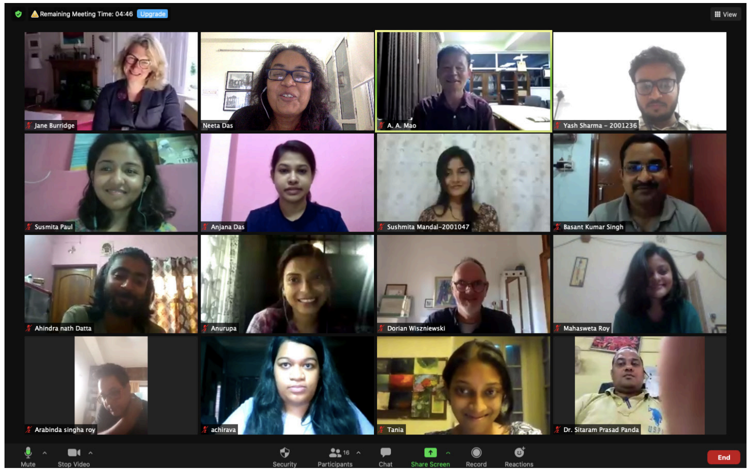
Concluding session

Dorian Wiszniewski : Vote of thanks
Open Discussion and Q/A on the projects
Sreyash Dasgupta : General thanks and end of seminar

▨ Botanical Gardens I Howrah

Drawing credits: **Ihanelly Hernandez**, Mexico I **Khalid Alemadi** , Qatar I **Sonia Muhammad**, Italy





Above: Site visit by the interns.

Left: Due to the pandemic, most of the seminars had to be online.

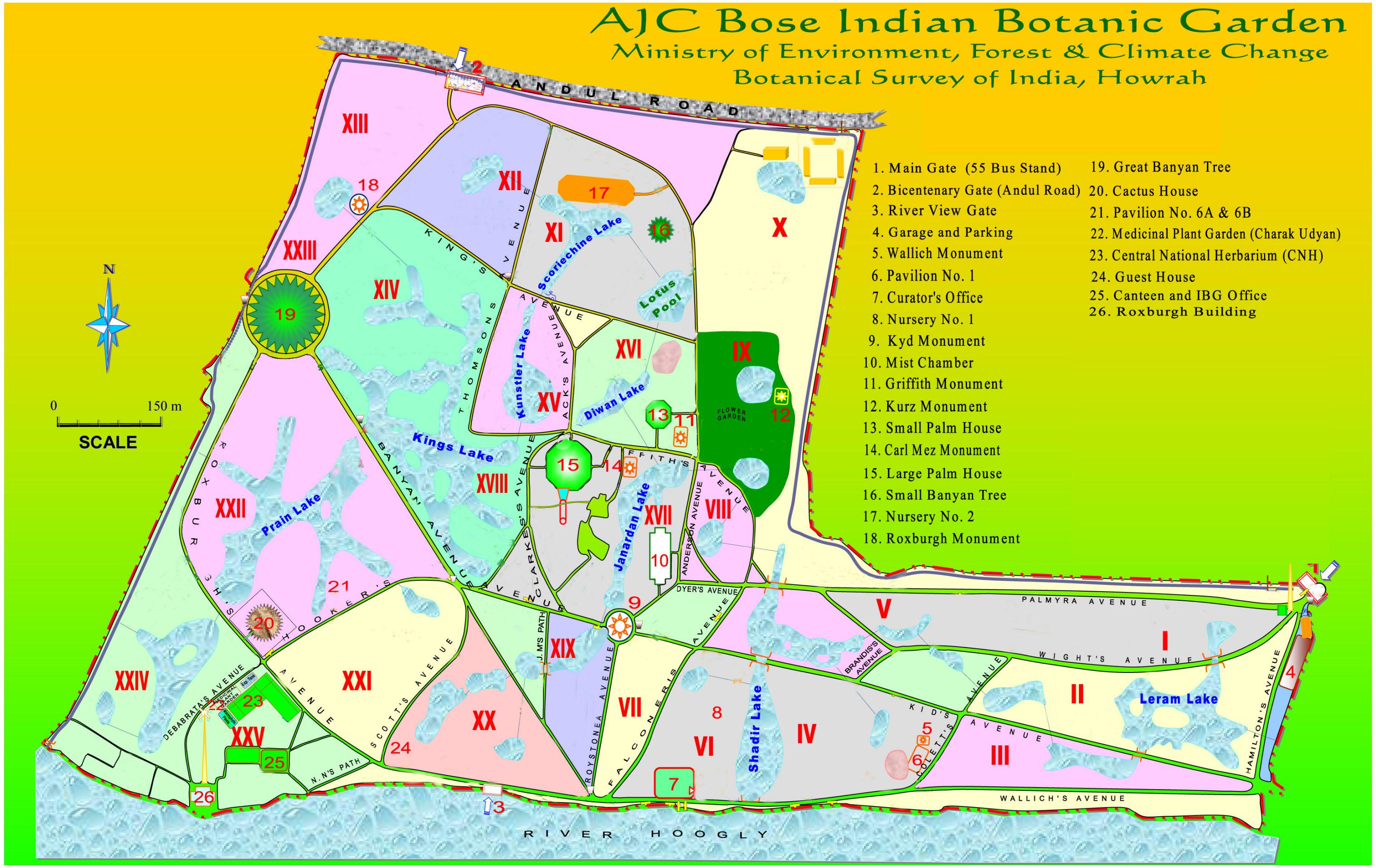
Findings of Interns

Achirava Raha.B. Arch (Pursuing), BIT, Mesra. (Student)
Arabinda Singha Roy.Phd (Archaeology) (Pursuing), Calcutta University. (Guest Faculty)
Mahasweta Roy.B. Arch (Pursuing), Jadavpur University. (Student)
Ahindra nath Datta.M.Sc (Horticulture), Calcutta University. (Self Employed)
Anjana Das.Masters of Landscape Architecture, SPA, Bhopal. (Self Employed)
Tania Das. Masters of Landscape Design, CEPT, Ahmedabad. (Self Employed)
Susmita Paul.Masters of Urban and Regional Planning, SPA, Vijayawada.(Faculty)
Sushmita Mandal.MBA (Pursuing), IIM, Tiruchirappalli. (Student)
Yash Sharma. MBA (Pursuing), IIM, Tiruchirappalli.(Student)
Anurupa Roy.Masters of Social Work, Visva Bharati, WB. (Self Employed)
Ishita Das.Masters of Art, Design & Communication, CEPT, Ahmedabad.(Self Employed)
Students of the AUDAcademy (Online format)

Visit to the Herbarium.

Achirava Raha

A Scot, Lt. Col. Robert Kyd established the Botanic Garden as the ‘Company Bagan’ (Garden for the East India Company) in 1786. A total of 310 acres was allotted for the garden. Kyd introduced various exotic plants and teak for ship building. Dr William Roxburgh introduced taxonomy and established a large herbarium. The garden grew under Dr Nathaniel Wallich who laid the foundation of the tea industry in India, and finally Dr William Griffith re-ordered the garden to the Natural system. To prevent flooding, in 1871 Sir George King devised a system of artificial lakes by raising the ground level. Maps and period photographs give a graphical story.



Left: Map of AJC Bose Indian Botanic Garden, 2011

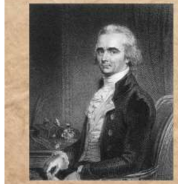
Right: A look at the AJC Bose Indian Botanic Garden, through the contributions of the various superintendents.
(Overview by Achirava Raha)

Acharya Jagadish Chandra Bose Indian Botanic Garden

1787-2021

1786-93
Lt Col Robert Kyd

Established the then "Company Bagan" under the patronage of the East India Comapny. A total of 310 acres was alotted for the Botanical Garden. He introduced various exotic plants and timber for ship building.

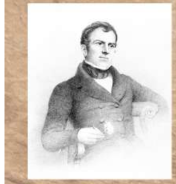


1793-13
Dr William Roxburgh

Known as 'Father of Indian Botany', he reoriented the objectives of the garden and laid down the foundation of modern taxonomy in India by establishing a large herbarium.

1815-46
Dr Nathaniel Wallich

Author of the "Wallich's Catalogue" which has more than 20,000 specimens. He laid the foundation of the tea industry in India through the Calcutta Botanic Garden. During this time, 40 acres of land was given to the Bishop College.



1842-44
Dr William Griffith

He was "the greatest botanist that ever set foot in India". Took up the task of re-ordering the garden accoring to the Natural system in contrast to the Linnean system.

1848-55
Dr Hugh Falconer

Recommended the cultivation of cinchona in the Indian subcontinent for use the its bark for treating malaria.

1855-61
Dr Thomas Thomson

Wrote the first volume of *Flora India* with J. D. Hooker.

1861-69
Dr Thomas Anderson

Introduced Cinchona cultivation in the Calcutta Botanic Garden by raising seedlings brought from Kew for trial.

1869-71
C B Clarke

Took charge of the Cinchona cultivation. Clarke wrote several books, including, 'The Subsubareas of British India'.

1871-98
Sir George King

Planned and executed the modern landscapping of the garden by devising a system of artificial lakes and raising the ground level. Introduced rubber plantation in India. He constructed a fire-proof herbarium. He also founded the BSI.

1898-05
Sir David Prain

Wrote many important books including the famous, 'Bengal Plants'. Sketched out a geographical plan of garden divisions in accordance with which future plantings were to be regulated.

1905-25
Lt Col
A T Gage

Prepared during Lt- Col A.T. Gage's time, a catalogue was published which included non-herbaceous phanerogams cultivated in the Calcutta Botanic Garden.

1925-37
C C Calder

Calder put horticultural education in India on a sound footing by launching a training course at the Calcutta Botanical Garden.

1927-36
Kali Pada Biswas

First Indian Superintendent of the Calcutta Botanic Garden.

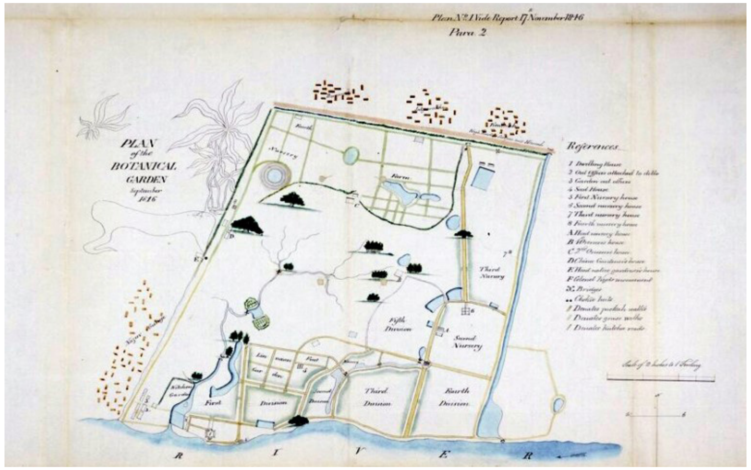
1955-60
Debabarta Chatterjee

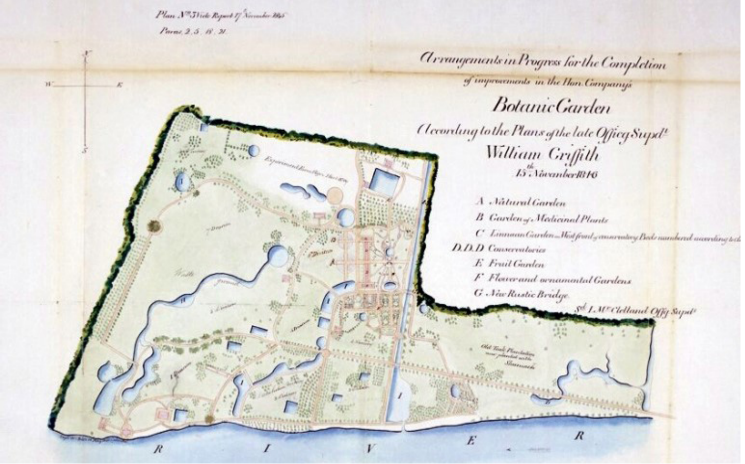
Published on topics including the systematics of endemic plant species in India and Burma, domestication of rice and cultivation of wheat.

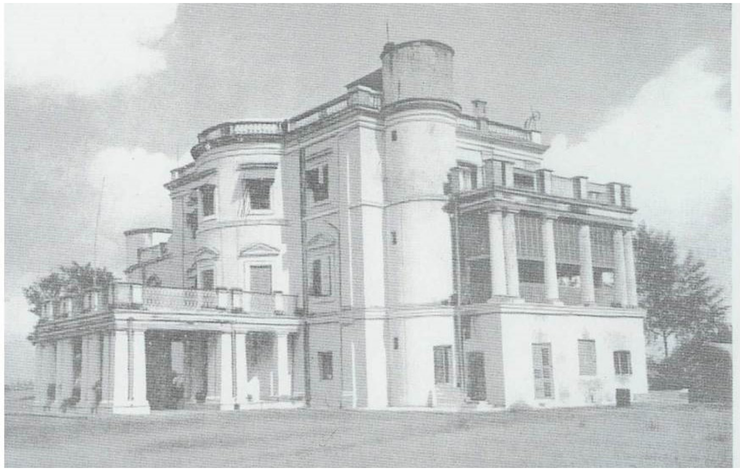
1961-63
J C Sengupta

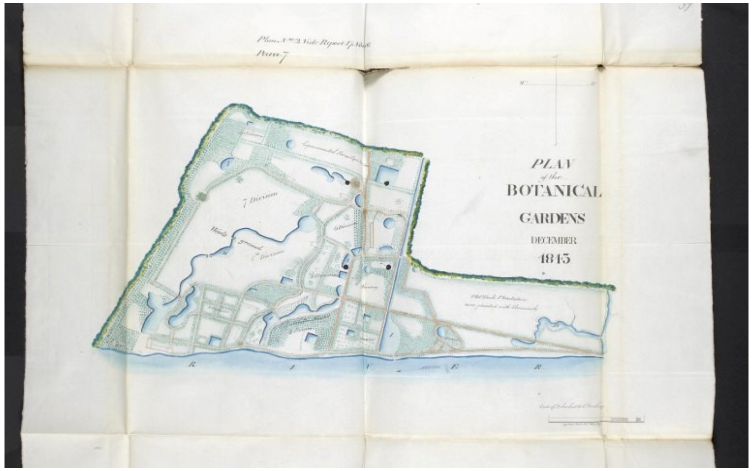
Initiated action on the transfer of some important herbarium collections in the charges of state government to the BSI. He became the first deputy director after Indian Botanic Garden became a part of BSI.

At present, Dr. Mao is the director of BSI India. Dr. Das is the Head of Office, A.J.C. Bose Indian Botanic Garden, BSI, Howrah.




Plan No. 3 Vide Report 17th November 1846
Paras. 2, 5, 18, 21
Arrangements in Progress for the Completion of improvements in the Hon. Company's Botanic Garden According to the Plans of the late Officg Supdt. William Griffith 15th November 1846
A Natural Garden
B Garden of Medicinal Plants
C Linnaean Garden
D.D.D Conservatories
E Fruit Garden
F Flower and ornamental Gardens
G New Rustic Bridge
Sd. J. McClelland Offg Supdt.
R I V E R





Top left: Plan of the Botanical Garden, September 1816 (one year after Wallich became Acting Superintendent).

Top right: Plan of the Botanical Gardens, December 1843 (the date when Griffith took temporary charge).

Centre left: Roxburgh's House

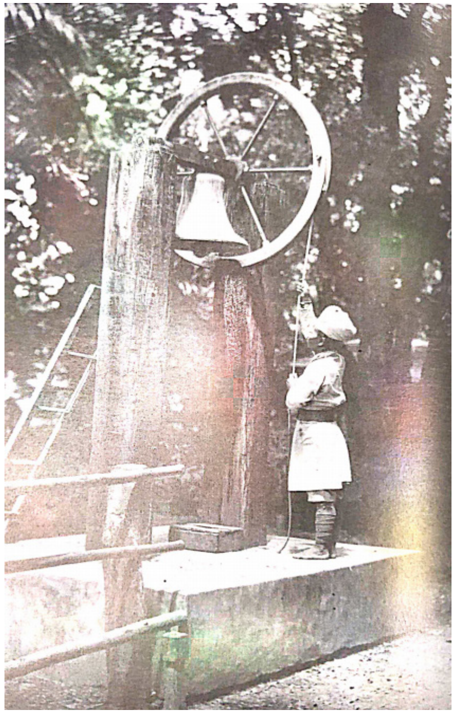
Centre right: Arrangements in Progress for the Completion of improvement in the Hon. Company's Botanic Garden according to the Plans of the late Offig Supdt. William Griffith, 15th November 1846.

Bottom left: Landscaping & excavation for developing lakes, grasslands, etc.- work in progress, beginning of nineteenth century.

Bottom centre: A contemporary photograph of the herbarium, completed in 1883.

Bottom right: Botanical illustration from the Annals of the Royal Botanic Garden, Calcutta.

DILLENIA OVATA H.F.&T.



Top left: The Garden's Time Keeper with Wallich's Bell (early 19th century).

Top centre: Map of AJC Bose Indian Botanic Garden, 1895

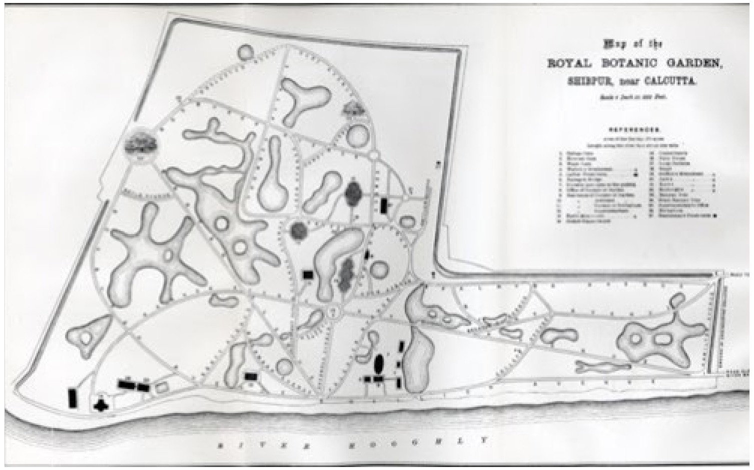
Top right: Landscaping of the Garden during Sir G. King's period (19th century).

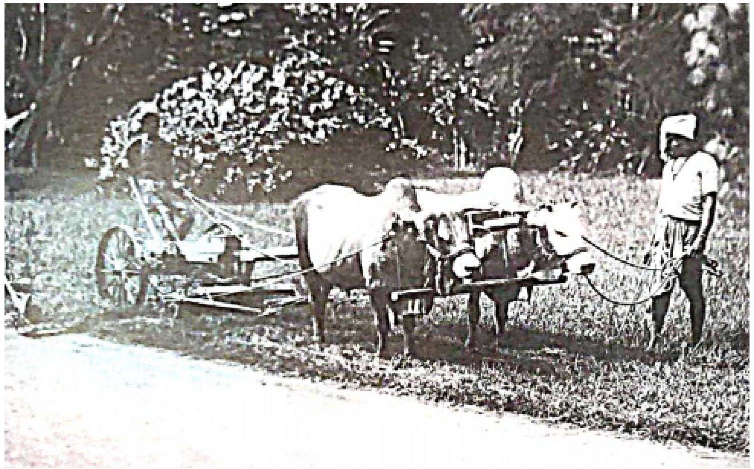
Centre left: Landscaping of the Garden during Sir G. King's period (19th century).

Centre right: Landscaping & excavation for developing lakes, grasslands, etc.- work in progress, beginning of nineteenth century.

Bottom left: Landscaping & excavation for developing lakes, grasslands, etc.- work in progress, beginning of nineteenth century.

Bottom right: Archival photograph of the main gate of the AJC Bose Indian Botanic garden.

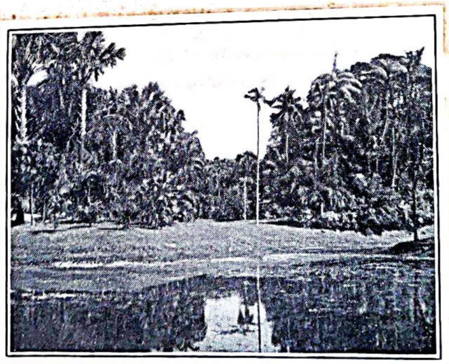




Left: Archival photograph of the AJC Bose Indian Botanic Garden.

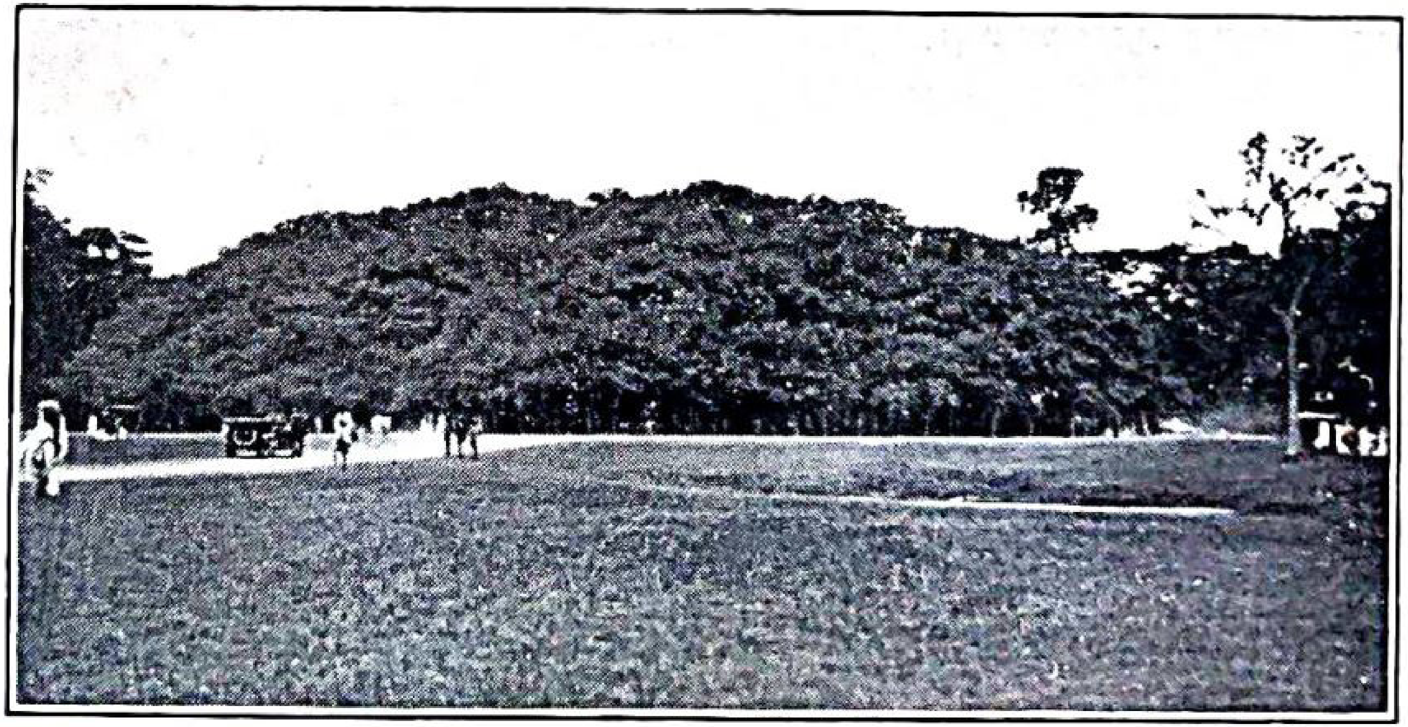
Bottom: Kyd's monument in AJC Bose Indian Botanic Garden.

GROUND FLOOR SHOWING THE LIBRARY TO THE LEFT AND LOCAL HERBARIUM TO THE RIGHT



THE PALMETUM

In the foreground on the right is the Talipot palm (*Corypha umrbaculifera*) in full bloom. This palm flowers when mature to its full size once in its life-time and after fruiting profusely, die.



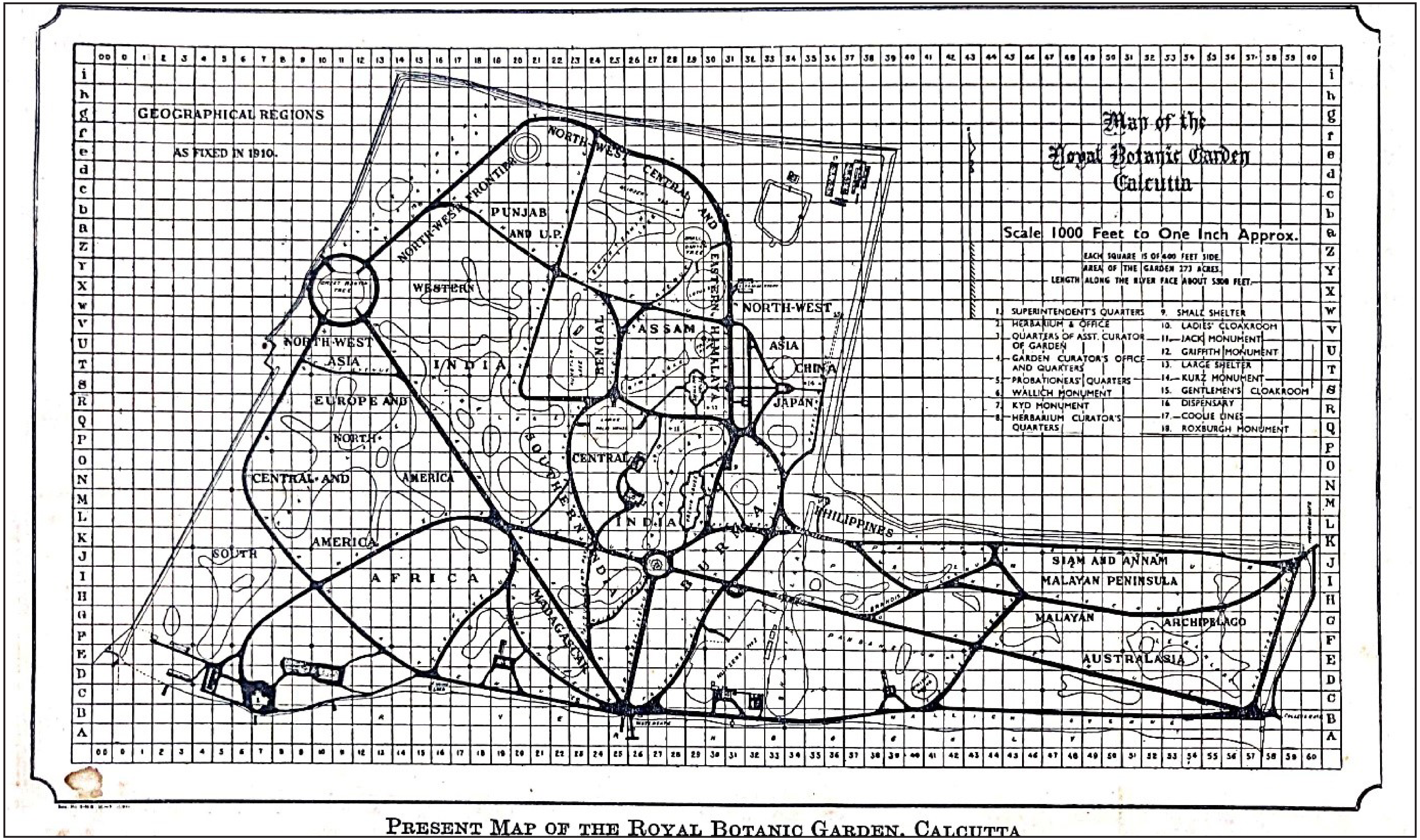
Top left: Inside the Large Palm House, AJC Bose Indian Botanic Garden.

Top centre: Ground floor showing the Library to the left and the Local Herbarium to the right.

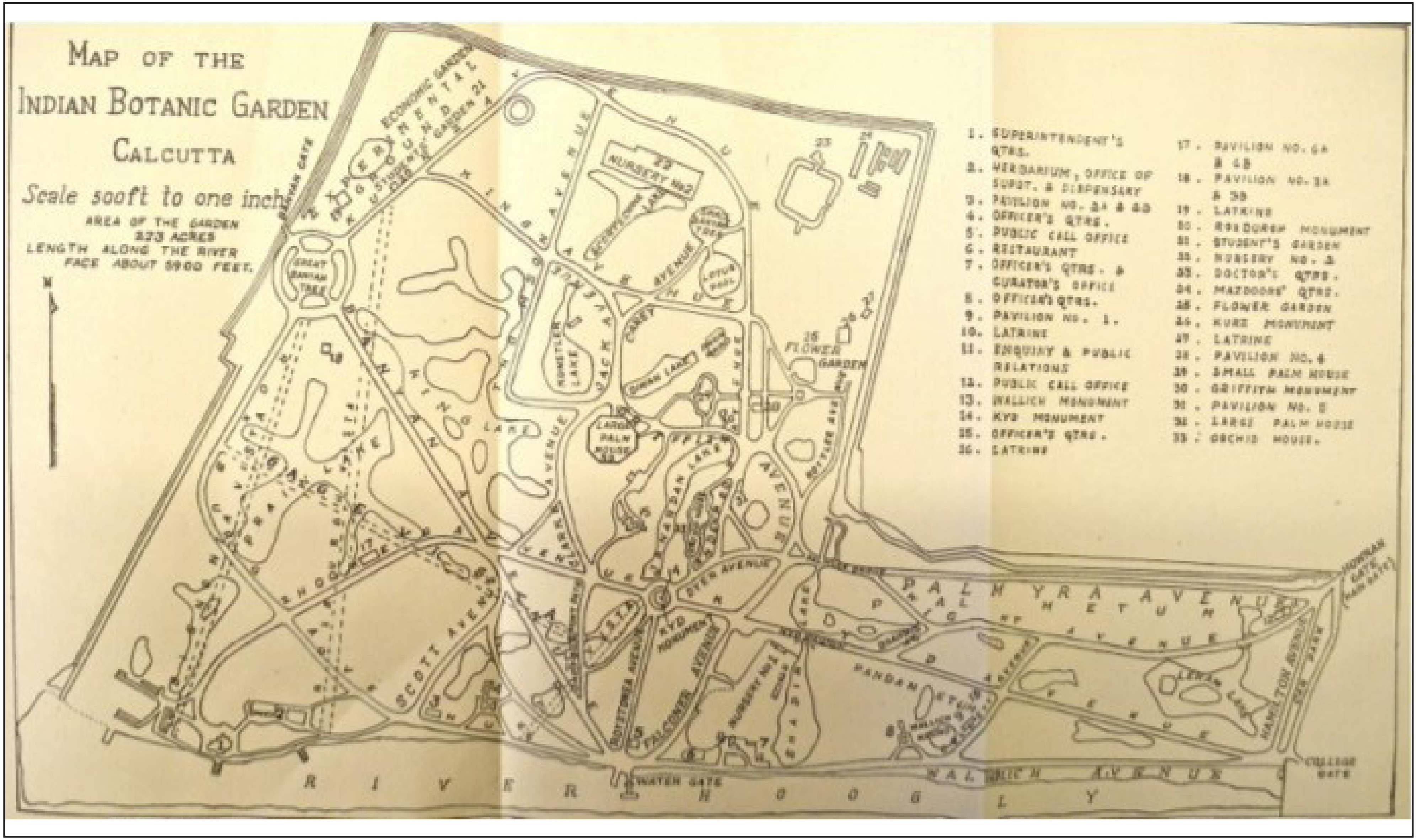
Top right: The Palmetum, AJC Bose Indian Botanic garden.

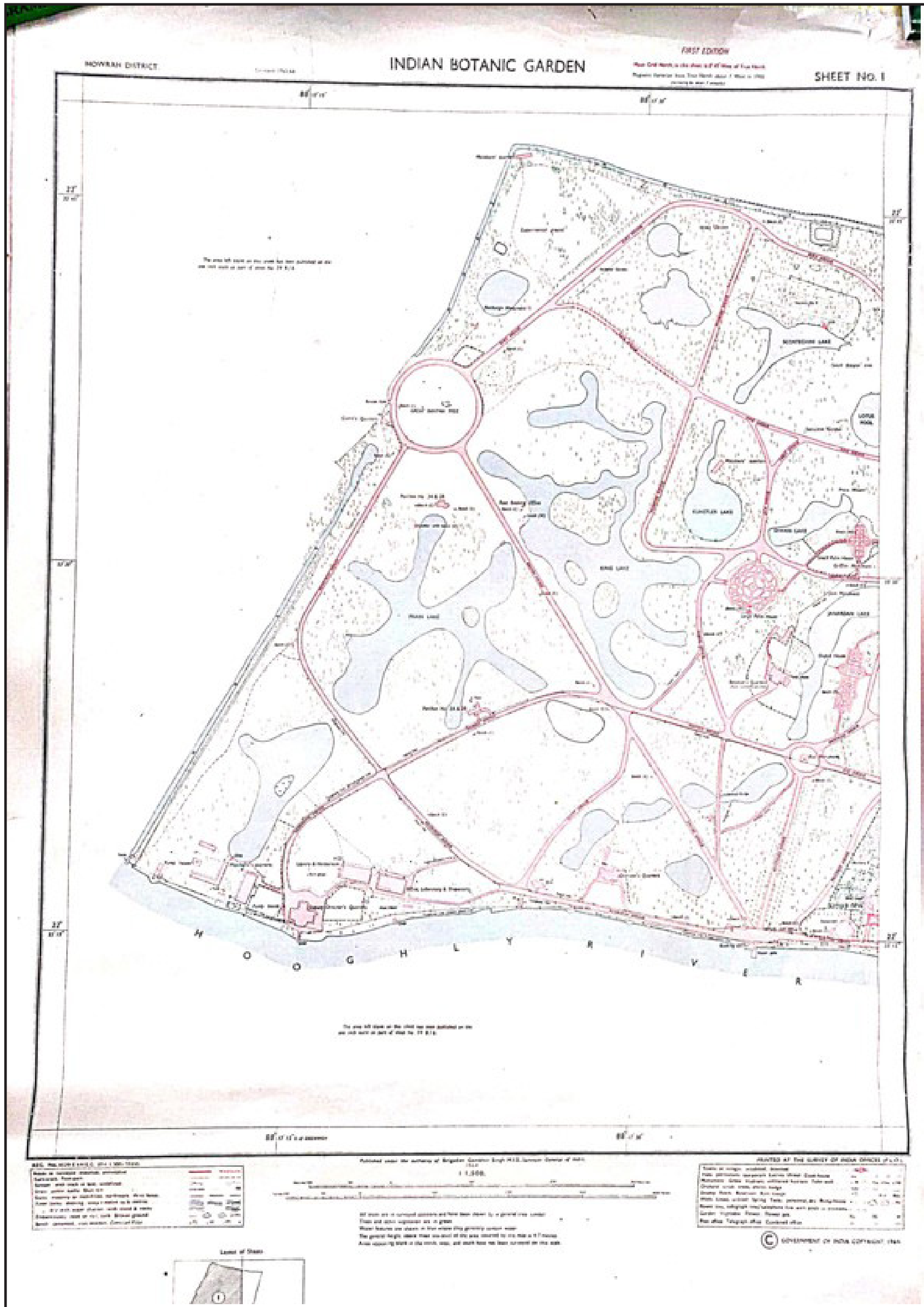
Bottom: The Great Banyan Tree, AJC Bose Indian Botanic Garden.

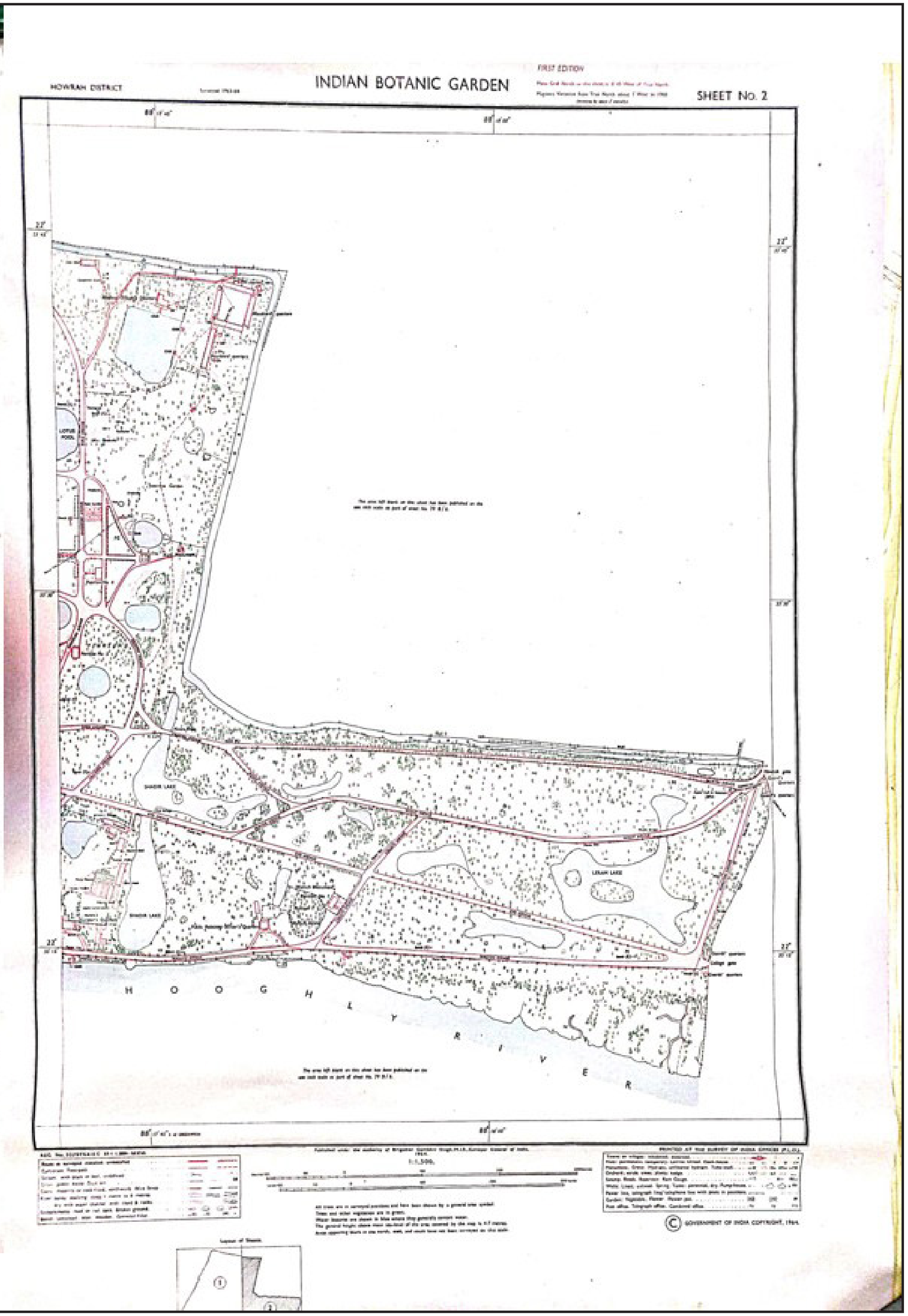
Map of the Royal Botanic Garden, Calcutta in 1910.



Plan of the Royal Botanic Garden, Calcutta in 1960.

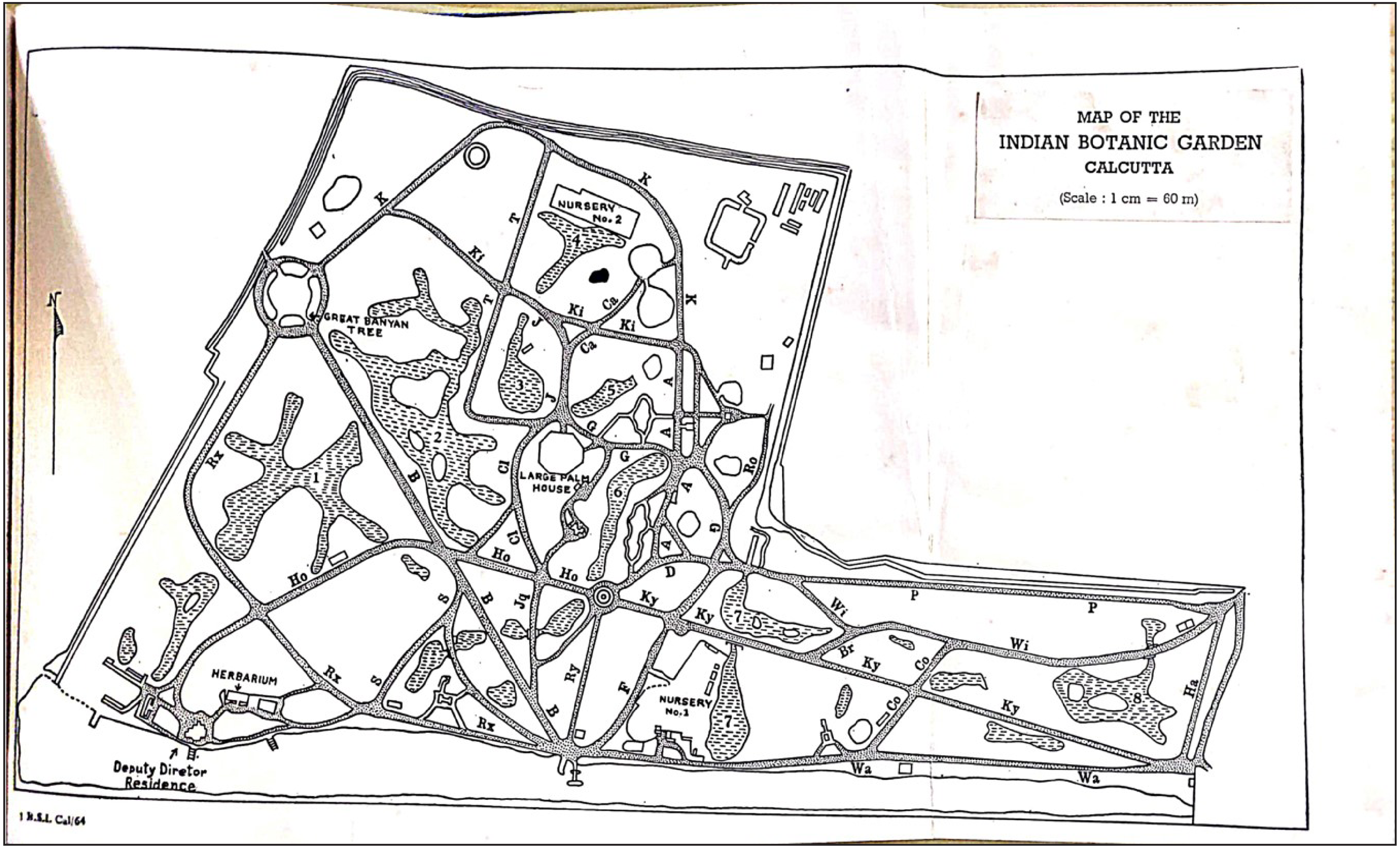



HOWRAH DISTRICT
INDIAN BOTANIC GARDEN
FIRST EDITION
SHEET No. 1
LOTUS POOL
H O O G H L Y R I V E R
1:1,500
© GOVERNMENT OF INDIA COPYRIGHT, 1964
Layout of Sheets


HOWRAH DISTRICT
INDIAN BOTANIC GARDEN
FIRST EDITION
SHEET No. 2
LOTUS POOL
H O O G H L Y R I V E R
1:1,500
PRINTED AT THE SURVEY OF INDIA OFFICES
© GOVERNMENT OF INDIA COPYRIGHT, 1964
Layout of Sheets

Left: Map of the AJC Bose Indian Botanic Garden, 1964 as housed in the Central National Herbarium, Kolkata.

Bottom: Map of the Indian Botanic Garden, Calcutta in 1964.



A. General Features of the Library

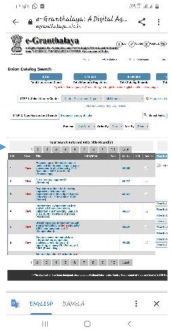
It has materials on Botany; Encyclopediatic and Dictionaries; Scientific Periodicals; Agriculture and Horticulture; Medical Botany and Medicine; Zoology; Chemistry; Biographies; Travels; Taxonomies; and Miscellaneous.

Process to Access the materials

Manual Accessioning System

Digital Accessioning System/ *e-granthalaya*

A few digitized books are there



Nature of Storage

Separate sections for Periodicals, Ph.D. thesis, Old Books, journals, and Taxonomies, but rest of materials are mixed with one another

Old Journal Section

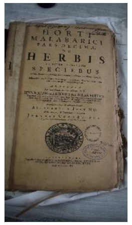
Periodical and newsletters

Old and Rare collection section

Collections of Wallich

Important Materials in the Library

A list of 510 rare books; Many hand written catalogue, Manuscripts, and letters; Old reports; Old atlas; Paintings, Icons, colour illustrious and many more.



Horti Malabarici

Handwritten Catalogue of Wallich

Old Painting

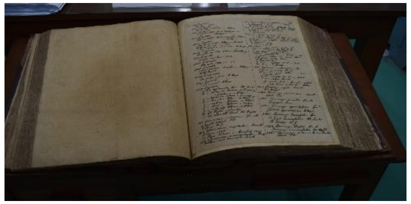
Materials

- 17th-18th century
- First half of 19th CE.
- Second half of 19th CE – present day

B. Herbarium (At a glance)

- Started by Dr. W. Roxburgh (1793-1819; 1376 Specimens) and enriched by Wallich (8000 spc), Griffith, Waight and Buchanan Fancies Hamilton.
- No less than two and half million specimens (they do not have exact number).
- Two sections: (i) General Herbarium and (ii) Local Herbarium
- Only the collections of Wallich and Roxburgh are arranged systematically.
- There is not any catalogue except the collections of Wallich which he made himself.

Catalogue of Wallich



Collected by Roxburgh from the Cape of Good Hope

Note

1. The library authority do not have any information about the exact number o boos paintings, and journals. Same in the case of herbarium.
2. Materials of 17th to F.H. of 19th CE are completely damaged and need immediate measure to preserve them.
3. Complete catalogue on library materials and herbarium specimens is needed.

The library at the Botanic garden has about 510 rare books, many hand written catalogues of Wallich, paintings, and catalogues. The Herbarium, started by Roxburgh, has no less than two and a half million specimens. Most material can be accesses through the digital system set up by BSI named e-granthalaya.

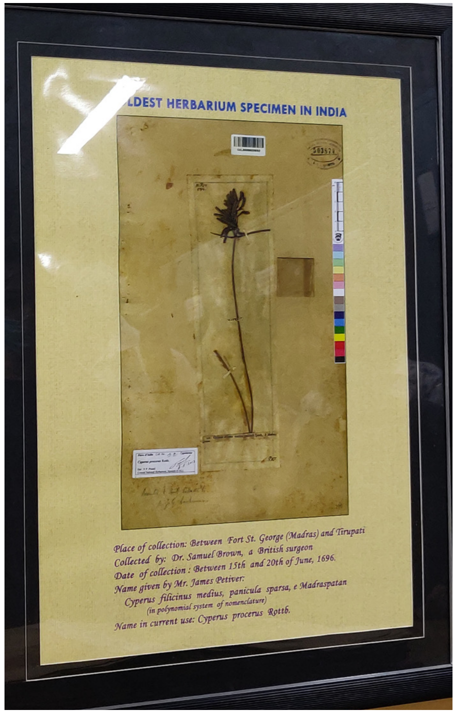
Left: Overview by Arabinda Singha Roy.

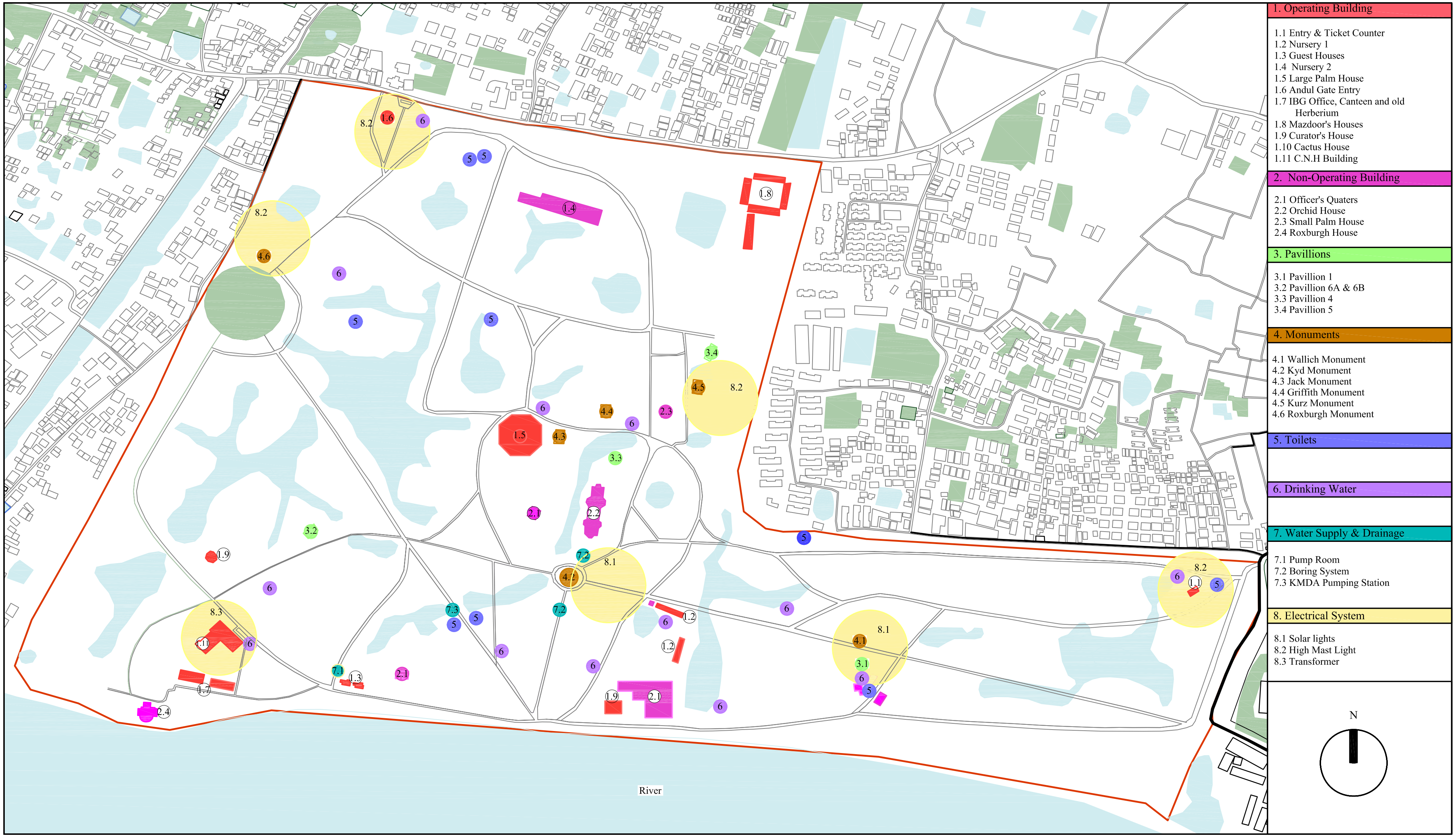
Top Right: Old Reports.

Bottom Left: Specimen collected by Roxburgh.

Bottom Centre: Periodical and Newsletters.

Bottom Right: Individual Paintings.


LDEST HERBARIUM SPECIMEN IN INDIA
Place of collection: Between Fort St. George (Madras) and Tirupati
Collected by: Dr. Samuel Brown, a British surgeon
Date of collection : Between 15th and 20th of June, 1696.
Name given by Mr. James Petiver:
Cyperus filicinus medius, panicula sparsa, e Madraspatan
(in polynomial system of nomenclature)
Name in current use: Cyperus procerus Rottb.


1. Operating Building
1.1 Entry & Ticket Counter
1.2 Nursery 1
1.3 Guest Houses
1.4 Nursery 2
1.5 Large Palm House
1.6 Andul Gate Entry
1.7 IBG Office, Canteen and old Herberium
1.8 Mazdoor's Houses
1.9 Curator's House
1.10 Cactus House
1.11 C.N.H Building
2. Non-Operating Building
2.1 Officer's Quaters
2.2 Orchid House
2.3 Small Palm House
2.4 Roxburgh House
3. Pavillions
3.1 Pavillion 1
3.2 Pavillion 6A & 6B
3.3 Pavillion 4
3.4 Pavillion 5
4. Monuments
4.1 Wallich Monument
4.2 Kyd Monument
4.3 Jack Monument
4.4 Griffith Monument
4.5 Kurz Monument
4.6 Roxburgh Monument
5. Toilets
6. Drinking Water
7. Water Supply & Drainage
7.1 Pump Room
7.2 Boring System
7.3 KMDA Pumping Station
8. Electrical System
8.1 Solar lights
8.2 High Mast Light
8.3 Transformer
N
River

Facing Page: Map indicating current infrastructure in the garden. (Source: Mahasweta Roy)

Above left: Officer's Quarters.

Above Right: Curator's Office.

Bottom Right: Guest House.

There was no comprehensive map of the Botanic Garden as it stands today. All operational and non operational buildings, monuments, pavilions, gates, utilities, seatings, bridges, and services have been studied and located as one drawing.

Ahindra Nath Dutta

When we started the study, we assumed that as conveyed by Dr. Mao there were around 50 sections with special plants. However, it was found that there is no such classification visible. Three or four new sections can be identified. The garden can boast of at least 39 iconic trees which have been duly recorded by the BSI with a geo tag.

Bottom: Drawing by Ahindra Nath Dutta.

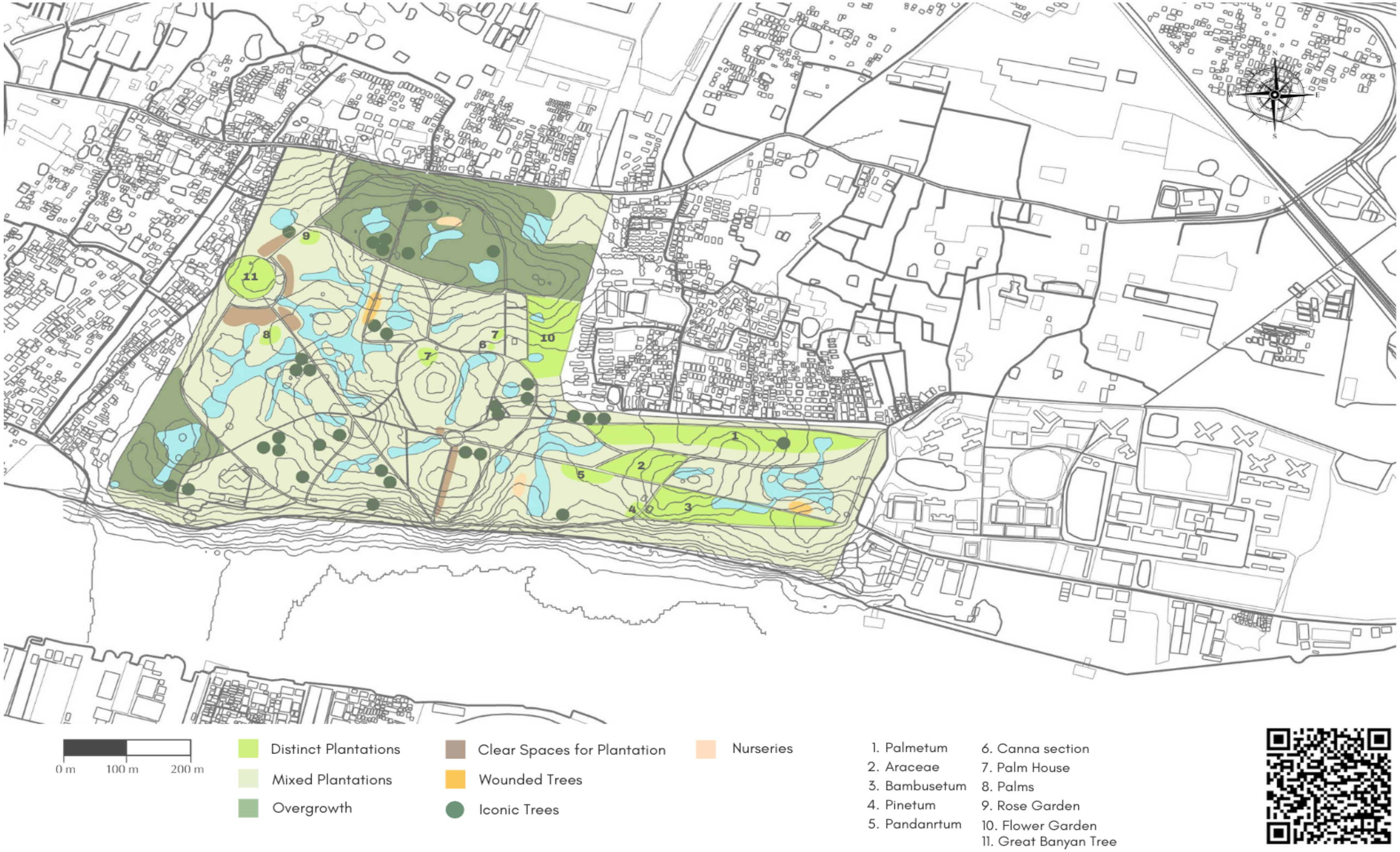
Facing Page: Sconic trees in the garden.

Top Left: Palms.

Top Right: Cycad.

Bottom Left: Baobab

Bottom Right: Great Banyan Tree.

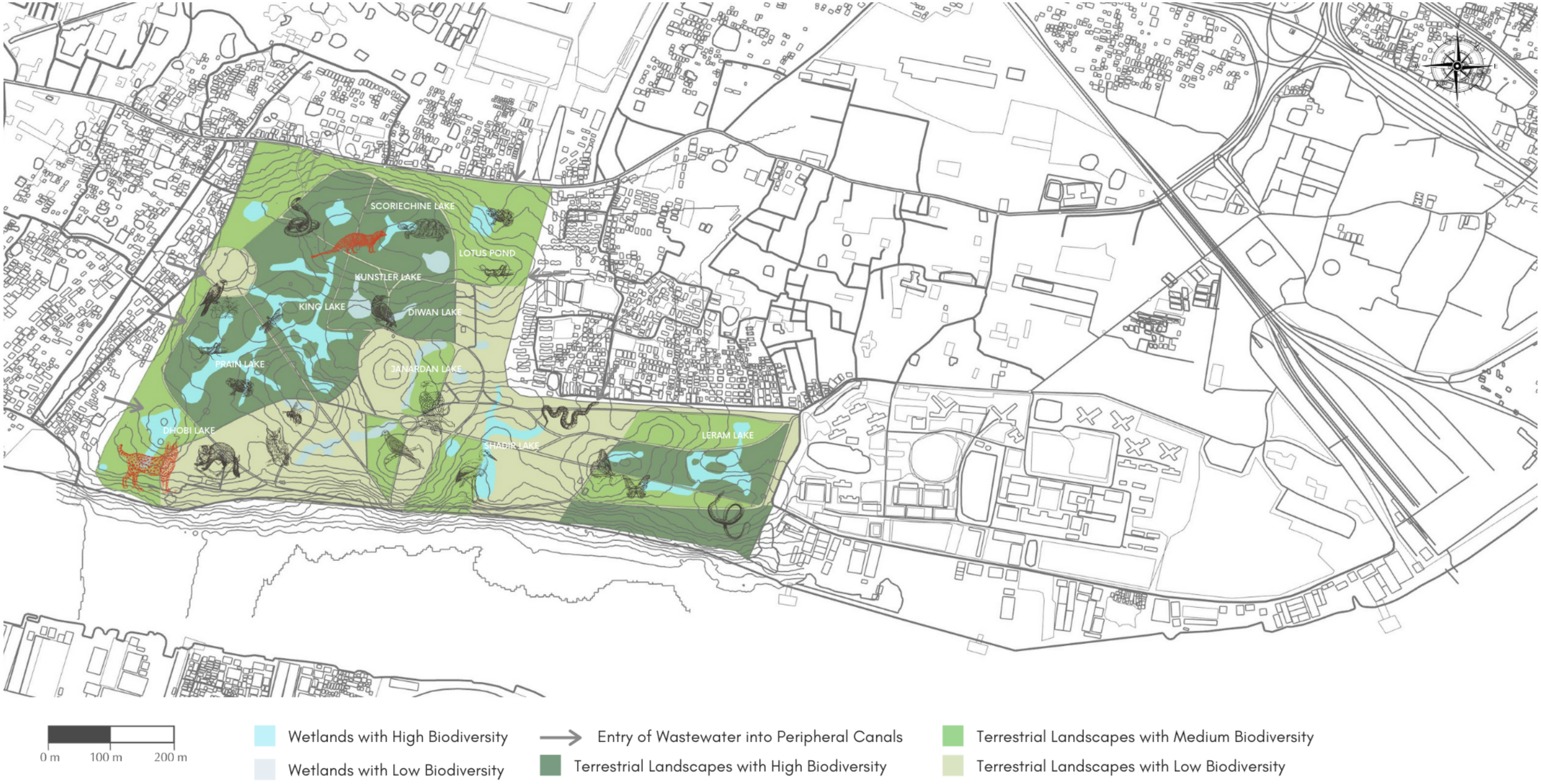


List of Iconic Trees

Monodora myristica
Kigelia Africana
Pimenta dioica L.
Adansonia digitat L.
Crescentia cujete L.
Crescentia cujete L.
Hyphaene thebaica L.
Cinnanonun canphora L.
Parmentiera cereifera
Couroupita guianensis
Magnolia champaca L.
Amherstia nobilis Wall.
Lodoicea maldivica
Victoria amazonica
Bambusa vulgaris
Ficus bengalensis L
Calamus rotang L.
Ficus krishnae C. DC.
Pterigota alata R.Br. var. irregularis
Napoleonaea imperiallis P. Beauv
Strychnos nux-vomica L.
Brownea coccinea Jacq
Elaeis guineensis
Hevea brasiliensis
Samanea saman Jacq.
Adenanthera pavonina L.
Pterocarpus santalinus
Cherysopyllum cainito L.
Elaeocarpus ganitrus
Shorea robusta
Santalum album L.
Saraca asoca Roxb.
Ensete superbum Roxb.
Heritiera littoralis
Taxodium distichum L. Rich.
Tectona grandis

Tania Das

Botanic Garden, created in 1787, is the first of its kind and has over 12,000 living plants. Aside from its tourist attraction, it also contains areas that were less maintained and have now formed a healthy eco system by natural regeneration. A study of the wetlands also presented a picture of a rich and bio-diverse aquatic life. IUCN Red list critically endangered and endemic Marsh Mongoose and Vulnerable species Fishing cats habitats were observed.


SCORIECHINE LAKE
LOTUS POND
KUNSTLER LAKE
KING LAKE
DIWAN LAKE
PRAIN LAKE
JANARDAN LAKE
DHOBI LAKE
SHADIR LAKE
LERAM LAKE
0 m
100 m
200 m
Wetlands with High Biodiversity
Wetlands with Low Biodiversity
Entry of Wastewater into Peripheral Canals
Terrestrial Landscapes with High Biodiversity
Terrestrial Landscapes with Medium Biodiversity
Terrestrial Landscapes with Low Biodiversity

Facing Page: Biodiversity Map.
(Source: Tania Das)

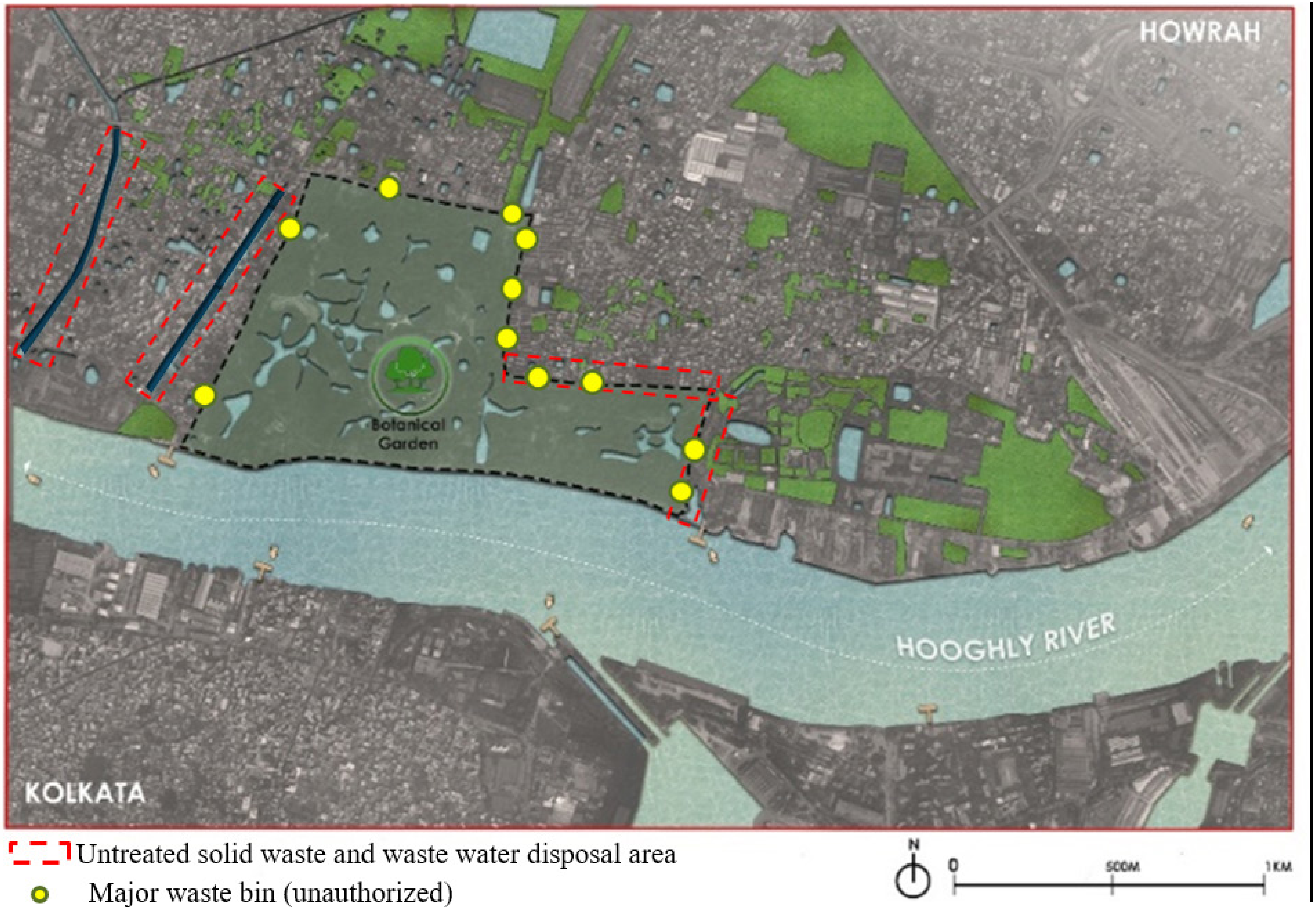
Top Left: Periphery of the Botanic Garden.

Top Centre: Highly biodiverse Shadir Lake.

Top Right: Walkway through a micro-biodiversity hotspot.

Bottom Right: Entry of wastewater next to the Great Banyan Tree

Bottom Left: Overgrowth as essential wildlife habitats.

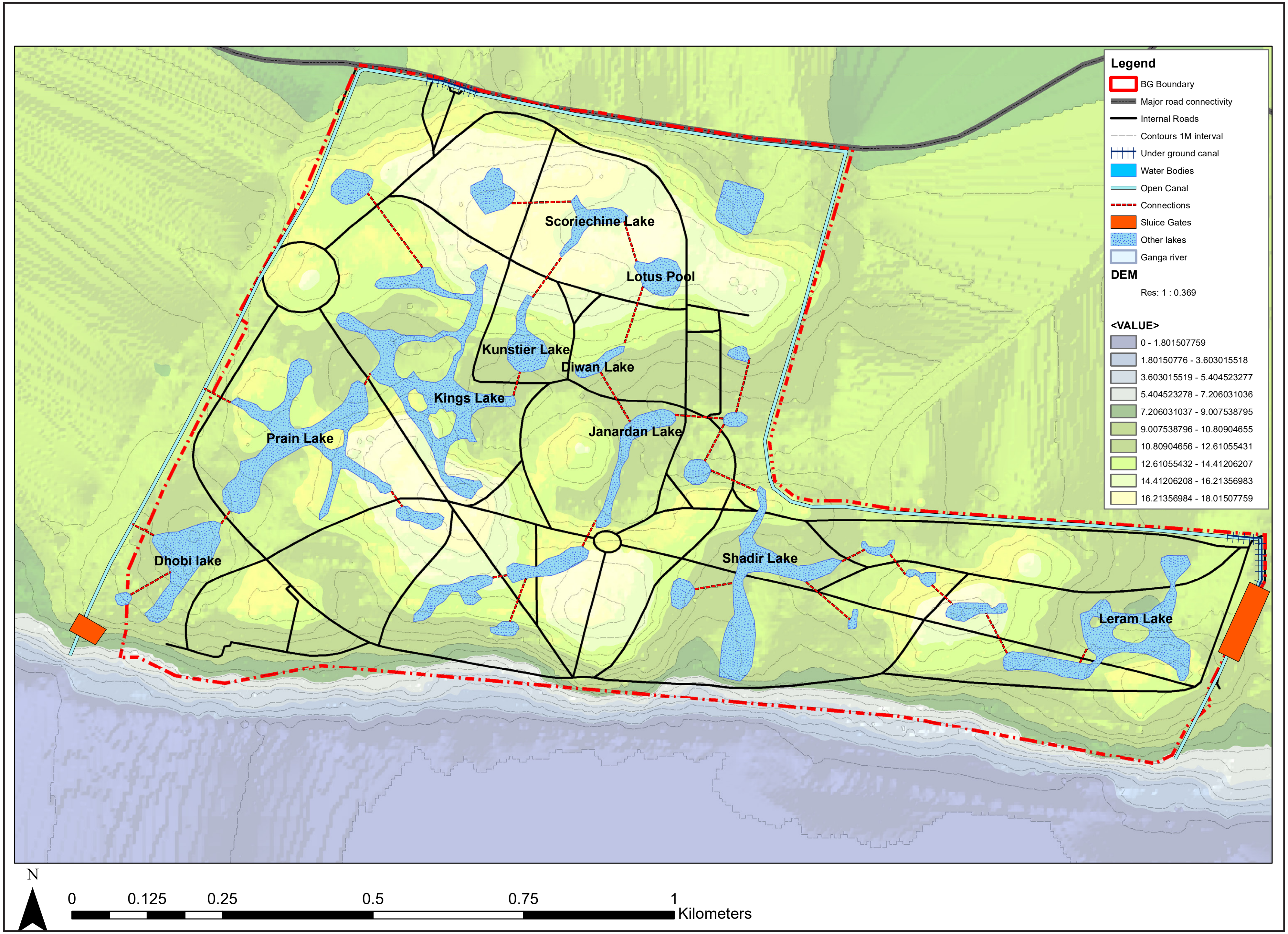

HOWRAH
Botanical Garden
HOOGHLY RIVER
KOLKATA
🟥 Untreated solid waste and waste water disposal area
● Major waste bin (unauthorized)
N
0
500M
1KM

The Botanical Garden has 24 wetlands, all connected to each other through underground tunnels, and to a canal that flows all around the west and north perimeter. The level of these water bodies are maintained by two sluice gates. This water management system is 131 years old and was created to keep the garden from flooding during the monsoons and high tides in the river Hoogly. Another interesting water system is the tapping of river water within the botanical garden, which is then pumped to two water purification plants, on the east and west, sides of Howrah, to be used by the whole city. Botanical Garden residents, however, use underground boring wells as a source for drinking water.

Left: Map indicating all entries.
(Source: Susmita Paul)

GOVT OF INDIA
ACHARYA JAGADISH CHANDRA BOSE INDIAN BOTANIC GARDEN
MINISTRY OF ENVIRONMENT & FORESTS
BOTANICAL SURVEY OF INDIA
HOWRAH - 711 103
NO SMOKING
MOTHER DAIRY
100% MILK ICE CREAM
MOTHER DAIRY
100% MILK ICE CREAM

View of the Andul Gate.


Legend
BG Boundary
Major road connectivity
Internal Roads
Contours 1M interval
Under ground canal
Water Bodies
Open Canal
Connections
Sluice Gates
Other lakes
Ganga river
DEM
Res: 1 : 0.369
<VALUE>
0 - 1.801507759
1.80150776 - 3.603015518
3.603015519 - 5.404523277
5.404523278 - 7.206031036
7.206031037 - 9.007538795
9.007538796 - 10.80904655
10.80904656 - 12.61055431
12.61055432 - 14.41206207
14.41206208 - 16.21356983
16.21356984 - 18.01507759
Scoriechine Lake
Lotus Pool
Kunstier Lake
Diwan Lake
Kings Lake
Janardan Lake
Prain Lake
Dhobi lake
Shadir Lake
Leram Lake
N
0
0.125
0.25
0.5
0.75
1
Kilometers

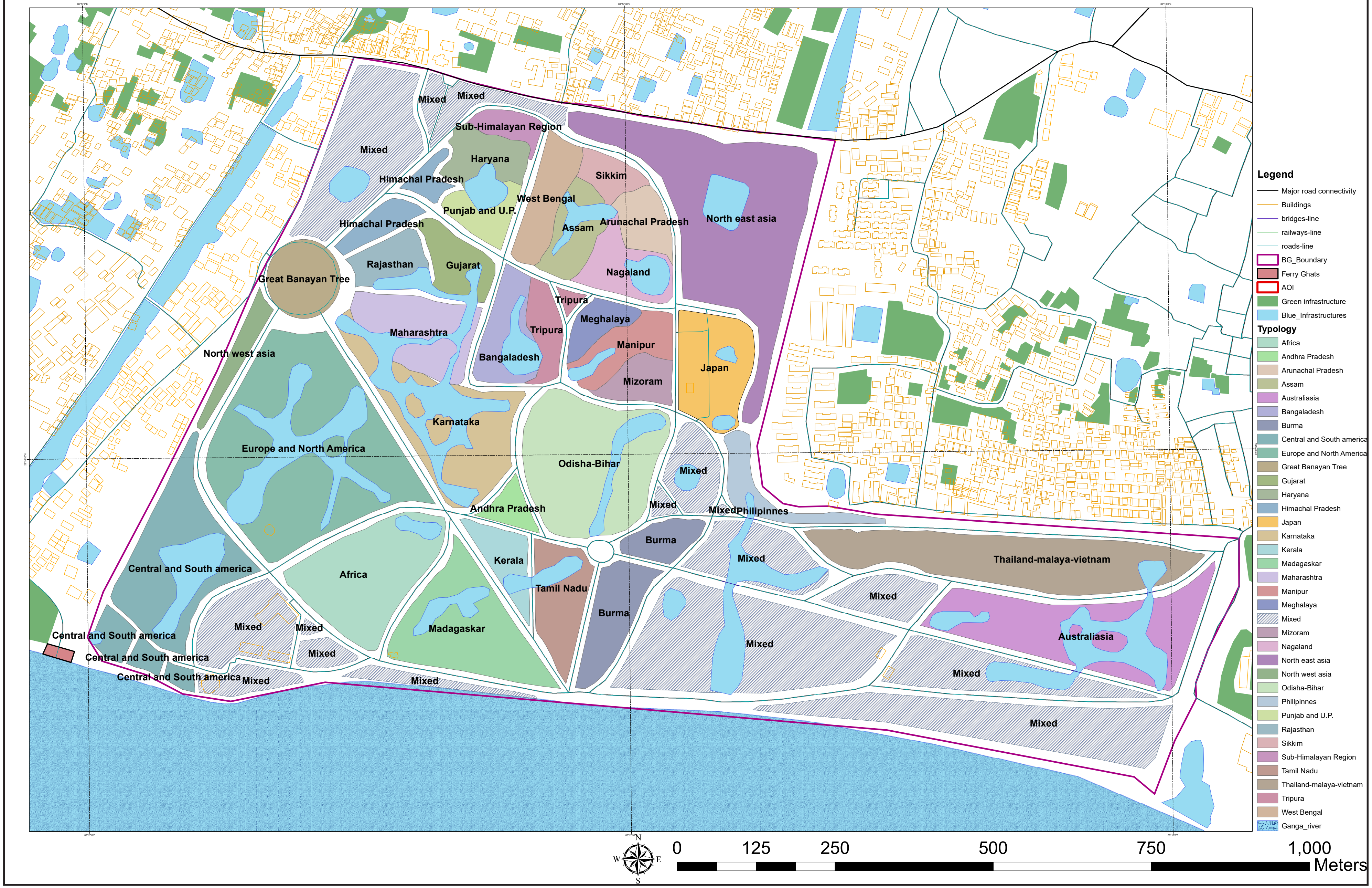
Left: Map showing water management system.
(Source: Susmita Paul)

Right: People alighting in the Nazirganj Jetty.

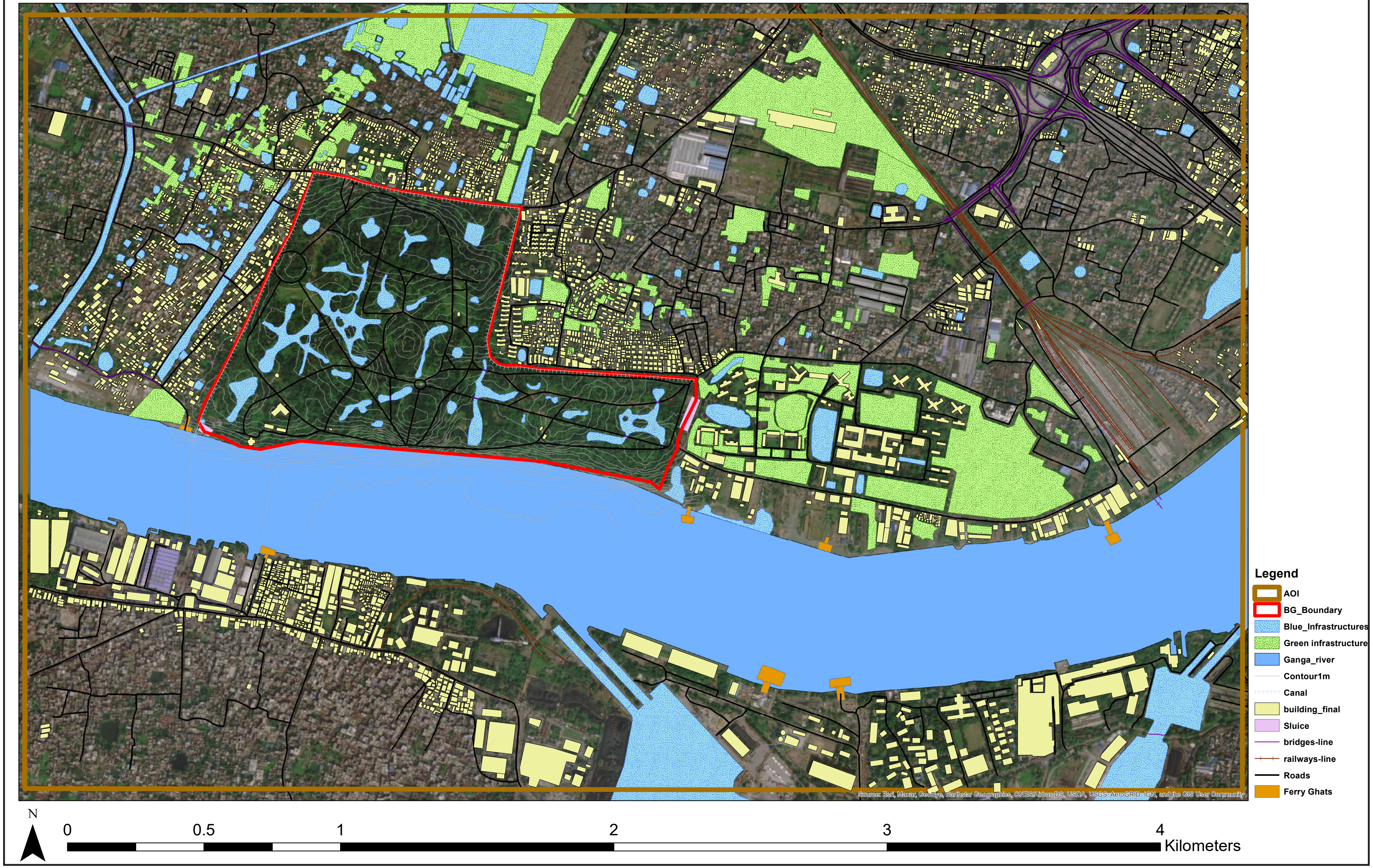
Next Page:
Left: Map showing Tree Typology Zoning.
(Source: Susmita Paul)

Right: Site Plan in GIS.
(Source: Susmita Paul)

Map showing Tree Typology Zoning.



Map of Acharya Jagadish Chandra Bose Indian Botanic Garden and surrounding



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Stakeholders	-Major highlights	- Aspirations
Scientist ‘C (Total Officers: 08) **Interviewed: 01**	- Insufficient funding - Lack of proper planning.	-Project Proposal, Submission of reports -Need Meetings, planning's.
Botanical Assistant (Total Scientific staff: 09) **Interviewed: 01**	--Residential and commercial pollutions destroying the bio diversity. --Lack of skilled manpower for proper maintenance, lack of knowledge in usage of machines.	-- Awareness on Environmental protection and sustainable development. -- Skill development training, Handbook.
Mali's (Total Garden staff: 73) **Interviewed: 03**	-Long time no recruitments, skilled garden staff need to increase for proper maintenance. -Lack of environmental awareness among visitors.	--- Fresh recruitment & engaged skilled person. --Sensitization or announcement, signboard for Dos and Don’ts .
Junior Administrative officer, Librarians, Supervisors) (Total Administrative staff: 23) **Interviewed: 06**	- Rare medicinal Plant needs more attention. - Lack of co-ordination between Administrative staff and ground staff.	---Medicinal plants need introduction in written, IEC materials. brochures, posters, website. -- Need organized meetings, trainings.
Security guard & Cutting and loping person (Total outsource persons: 26) **Interviewed: 04**	--Need more manpower. --Need Wireless communication service along with CCTV facility. -- Reported some illegal activities like drugs, alcoholism, poor safety measures at some particular area.	---Fresh recruitment or outsource engagement. --basic infrastructure need to be developed. -- Sensitize drug users.
Morning Walkers (Total registered 5000) **Interviewed: 06**	--Enjoy the fresh morning air, wandering about unknown fruits , flowers, birds. --Lack of proper maintenance of roads, toilets, benches, roadside bushes.	-The environment must be clean and safe for all. - Infrastructural development needs to be done.
Visitors Approx. 200 **Interviewed: 06**	--Need rectification of guide map with signboard. --No proper sitting arrangement, No shed for dry & rainy season.	-Guide map and basic infrastructure need to be developed.
Community members Ward no: 39 & 45 (partly), Approx. Population: 35,000 & 30,000 **Interviewed: 04**	-Poor hygienic condition, narrow lanes , traffic congestion and poor waste management system. --The Goodwill of B.G has to be maintained and increased.	-Awareness among the community members on significance of B.G and its ecological importance.
Public representatives. **Interviewed: 02**	--Shibpur mainly attracts tourist for AJC. Botanic Garden. --Some Landless families occupied the free spaces of outside wall.	- People need to understand and work towards sustaining the “ The lunges of the City” -Priority on their part for restoring the garden.
AJC B. Garden Police Station **Interviewed: 01**	-Robbery, Burglary, theft, crime against women , Rioting, Rape etc.	-Sensitize community members regarding violence free area.
Howrah Municipal Corporation **Interviewed: 00**	-Not contacted due to State Election and COVID Pandemic.	-Not contacted due to State Election and COVID Pandemic.

The study entailed a process of observation, interviewing major stakeholders, and conducting group discussions to highlight areas of strengths and concerns for the benefit of the Botanic garden and its stakeholders. Constructive engagement with the community could lead to cleanliness, reduction of pollution, reduced encroachments, smooth traffic flow, and easier access for visitors. This would also go a long way in reducing crime, intrusions, and unwanted activities inside the garden.

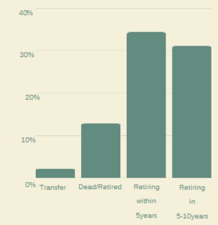
Facing Page: Overview by Anurupa Roy.

There are 5000 registered morning walkers at the Botanical Garden.

AJCB INDIAN BOTANIC GARDEN

RESEARCH DATA COLLECTION

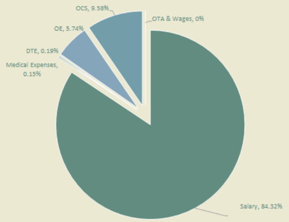
STAFF DATA



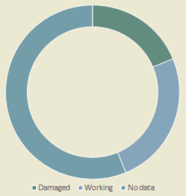
More than 60% of the garden staff would retire within the next 10 years

Almost 20% of the manual workers in the garden are 60 years or above in age.

BUDGET BREAKUP



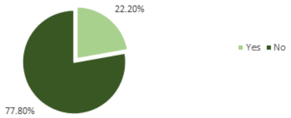
INVENTORY STATISTICS



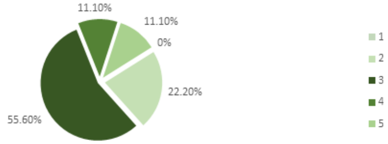
*Link to survey questionnaire: https://forms.gle/JFPfDEyadYLBDph96

EMPLOYEE ENGAGEMENT

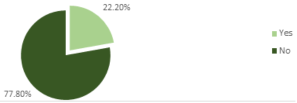
Was an induction organized to understand the organization better?



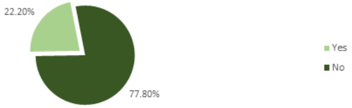
Rate your workplace environment on a scale of 1 to 5

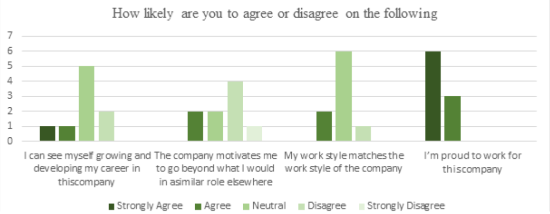


Do you have the tools necessary to consistently perform your task well?

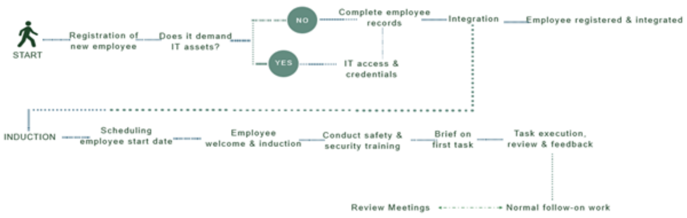


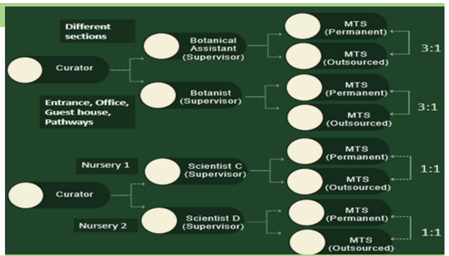
Do your leaders keep you informed about what is happening in the organization?



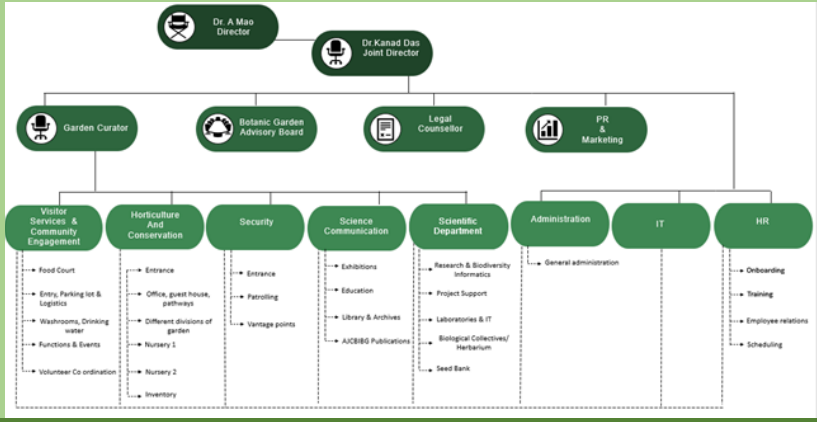


Onboarding Process Chart


START
Registration of new employee
Does it demand IT assets?
NO
YES
Complete employee records
IT access & credentials
Integration
Employee registered & integrated
INDUCTION
Scheduling employee start date
Employee welcome & induction
Conduct safety & security training
Brief on first task
Task execution, review & feedback
Review Meetings
Normal follow-on work



Hierarchy Chart



HUMAN RESOURCES

i. Introduction of Botanic Garden Advisory Board
ii. Marketing & HR interns
iii. Horticulture and Conservation
iv. Boosting work culture
v. Improving departmental operations

INFORMATION FLOW

Noticeboard

A simple noticeboard for all important meetings, events and decisions as a means of facilitating a uniform top-down information flow.

Inter Department Knowledge Sharing

People need to be able to actively share knowledge across the whole organization. A monthly gathering should be organized to promote honest discussions and healthy disagreements.

Engage Employees

One simple way to induce employee engagement is to initiate employee advocacy. Moreover, internal communications encourage employees to brainstorm among with each other. Keep employees informed on company scores and progress towards goals and involve employees in developing plans to improve the company.

Feedback

Close attention must be paid to employee feedback about internal communications. Measurement of internal communication efforts must be done on a regular basis.

MARKETING STRATEGY

1. **CREATING PUBLIC ENGAGEMENT**
a. Social Media **b.** Events **c.** Educational Program **d.** Volunteering

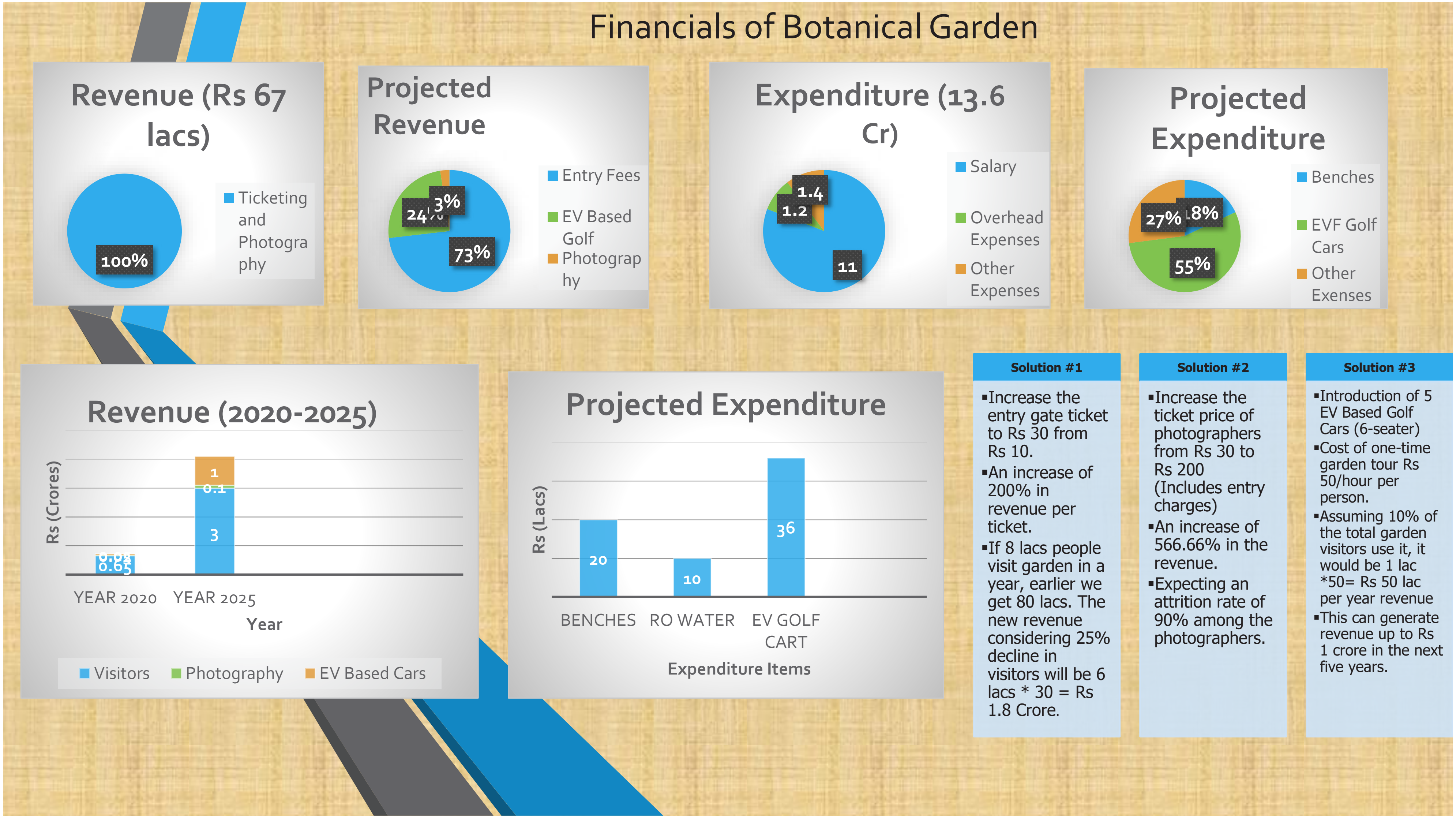
2. **PARTNERSHIPS**
a. Research and Education Partnership **b.** WB Tourism
c. Indigenous artists and communities **d.** CSR

3. **INFRASTRUCTURE & RESEARCH**
a. Roadways and parking areas **b.** Washrooms and benches
c. Food court and canteen **d.** Laboratories

A master plan has been developed from extensive consultation between stakeholders and public. It outlines how the institution would be run, marketed, and funded to successfully achieve its goals and objectives through efficient use of staffing and volunteers, continued partnerships, and community participation. Fiscal sustainability and improved visitor experience is a key part of this vision.

Facing Page: Overview by Sushmita Mandal.

Gardeners at work at the Botanical Garden.



Financials of Botanical Garden

Solution #1

- Increase the entry gate ticket to Rs 30 from Rs 10.
- An increase of 200% in revenue per ticket.
- If 8 lacs people visit garden in a year, earlier we get 80 lacs. The new revenue considering 25% decline in visitors will be 6 lacs * 30 = Rs 1.8 Crore.

Solution #2

- Increase the ticket price of photographers from Rs 30 to Rs 200 (Includes entry charges)
- An increase of 566.66% in the revenue.
- Expecting an attrition rate of 90% among the photographers.

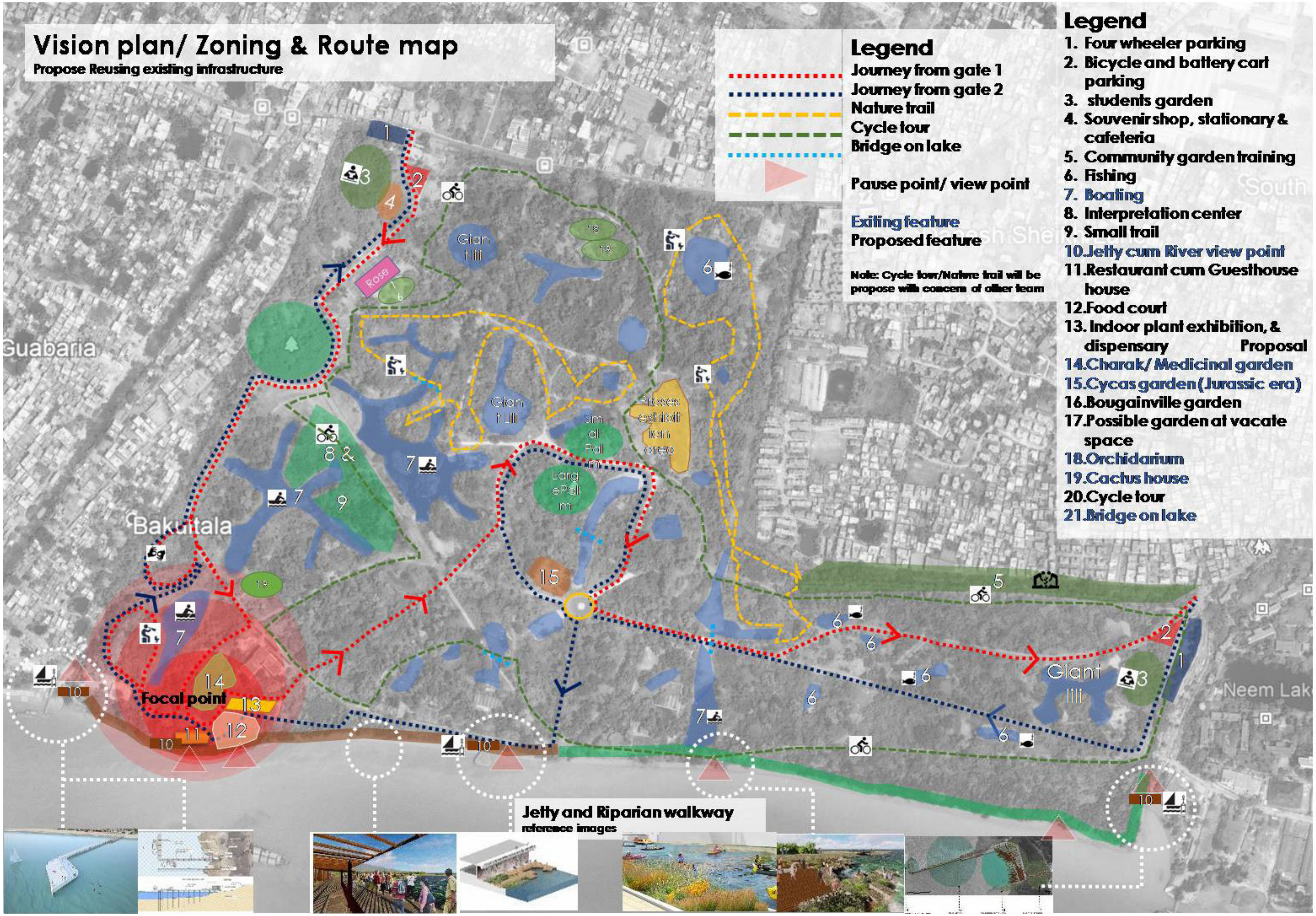
Solution #3

- Introduction of 5 EV Based Golf Cars (6-seater)
- Cost of one-time garden tour Rs 50/hour per person.
- Assuming 10% of the total garden visitors use it, it would be 1 lac *50= Rs 50 lac per year revenue
- This can generate revenue up to Rs 1 crore in the next five years.

When it comes to the revenue generation of the Botanic Garden, there is only one single source, i.e. the entrance ticket. INR 67 lacs are generated through entrance tickets but just the salaries of permanent staff and other expenses amount to INR 11 crores. To solve this problem the garden should have the dual purpose of research and revenue generation with the help of Public Private Partnership projects for sustainable growth in the coming years.

Facing Page: Overview by Yash Sharma.

Garden store at the Botanical Garden.


Vision plan/ Zoning & Route map
Propose Reusing existing infrastructure
Legend
Journey from gate 1
Journey from gate 2
Nature trail
Cycle tour
Bridge on lake
Pause point/ view point
Exiting feature
Proposed feature
Note: Cycle tour/Nature trail will be propose with concern of other team
Legend
1. Four wheeler parking
2. Bicycle and battery cart parking
3. students garden
4. Souvenir shop, stationary & cafeteria
5. Community garden training
6. Fishing
7. Boating
8. Interpretation center
9. Small trail
10.Jetty cum River view point
11.Restaurant cum Guesthouse house
12.Food court
13. Indoor plant exhibition, & dispensary
Proposal
14.Charak/ Medicinal garden
15.Cycas garden (Jurassic era)
16.Bougainville garden
17.Possible garden at vacate space
18.Orchidarium
19.Cactus house
20.Cycle tour
21.Bridge on lake
Guabaria
Bakultala
South
Neem Lake
Rose
Giant lili
Small Palm
Large Palm
Flower exhibition area
Focal point
Jetty and Riparian walkway
reference images

Many ideas have been floated by the BSI to improve the visitor experience like development of the Cycad garden, development of a Rose and Bougainville garden, cafes, utilities, and even a rope way. The idea is to re-create a journey through these various pause points which lead towards the riverside and develop the water edge for a unique experience.

Facing Page: Drawing by Anjana Das.

Right: Dr. A.A. Mao, director of BSI, briefing the interns regarding proposed Projects; Above right is the Rose garden and Bottom Right is Proposed Bougainvillea Garden.

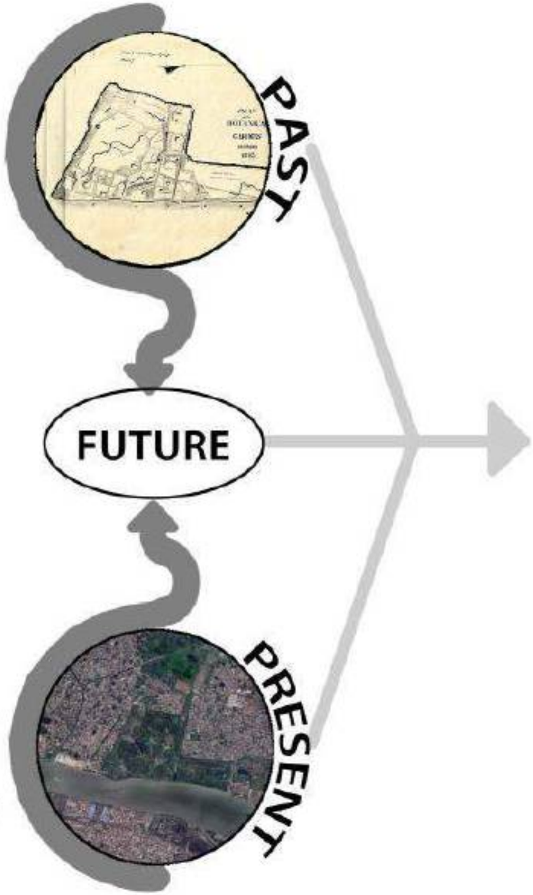
(All drawings and illustrations by AUDA students)

Role of the Botanical Garden through time:

A PLACE TO **LEARN, DEVELOP AND UNDERSTAND** BOTANICAL ADVANCEMENT.

A PLACE FOR **LEISURE**, TO PROMOTE **WELLBEING AND ASTHETIC VALUE** OF THE SOCIETY.

A PLACE TO GROW **CASH CROPS** TO HELP WITH AGRICULTURAL KNOWLEDGE AND PROCESSES.



FUTURE ROLE

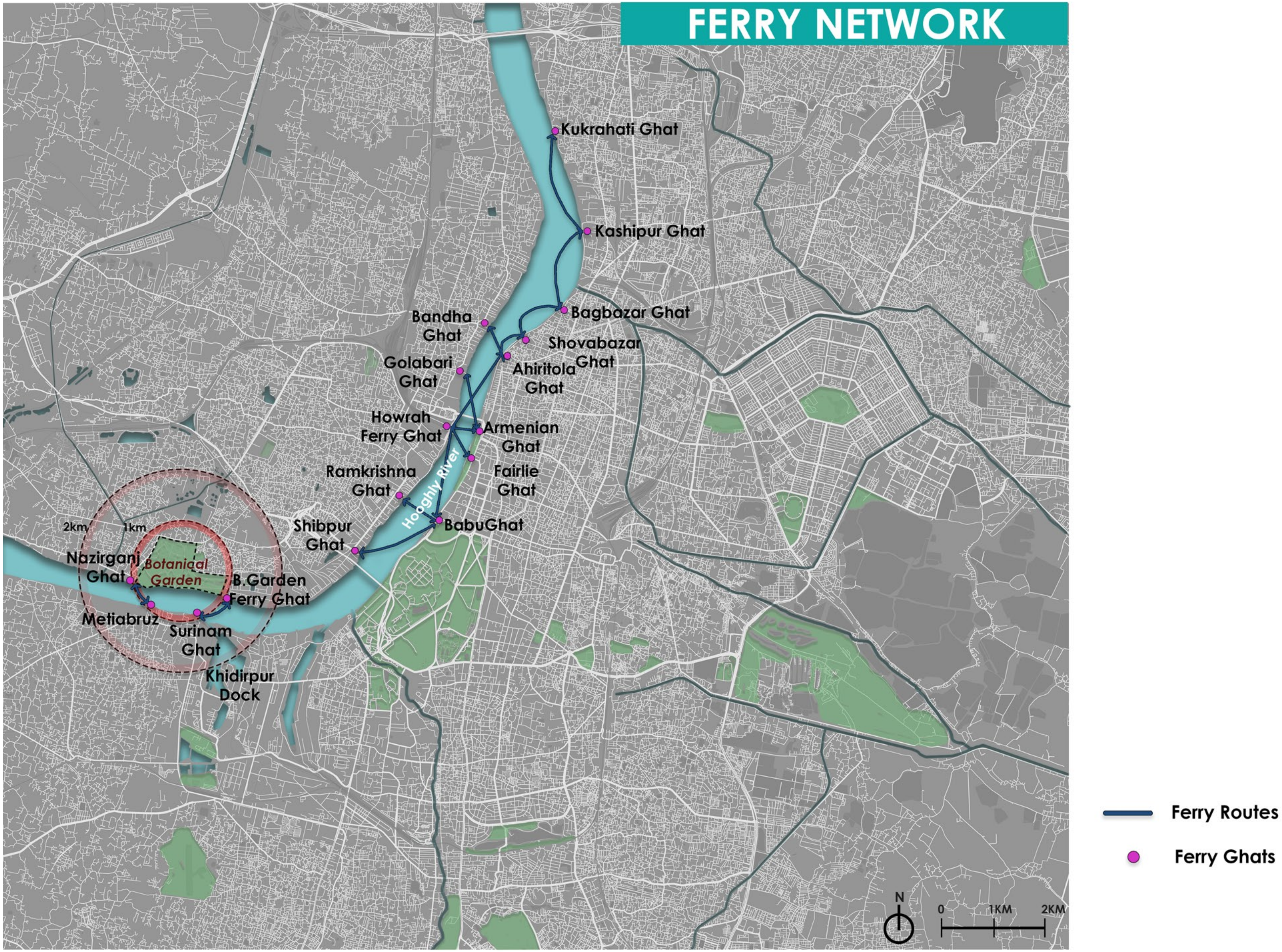
THE PLACE SHOULD RETAIN ITS ROLE OF **TEACHING** THE COMMUNITY AND PROVIDING WITH AN OPENSPACE TO PROMOTE BETTER **ASTHETICS AND WELLNESS**. BUT THE THREATS AND REQUIREMENTS HAVE CHANGES IN **CONTEMPORARY TIMES** AND PEOPLE NOW NEED TO LEARN ABOUT **SUSTAINABLE LANDSCAPE, URBAN GARDENING, BLUE GREEN INFRASTRUCTURE, MITIGATION GREENS AND OVERALL RESILIENCE**. FOR THIS THE GARDEN NEEDS TO **UPGRADE ITSELF, ITS INFRASTRUCTURE AND ITS SETTING** TO **PROMOTE AND TEACH THE SOCIETY ABOUT SUSTAINABILITY AND RESILIENCE**.

A PLACE OF **HISTORICAL, CULTURAL AND SCIENTIFIC IMPORTANCE**

A PLACE FOR **LEISURE**, TO PROMOTE WELLBEING AND ASTHETIC VALUE OF THE SOCIETY.

A PLACE OF **LANDMARK** FOR THE CITY THAT ADDS TO THE IDENTITY OF KOLKATA.

FERRY NETWORK

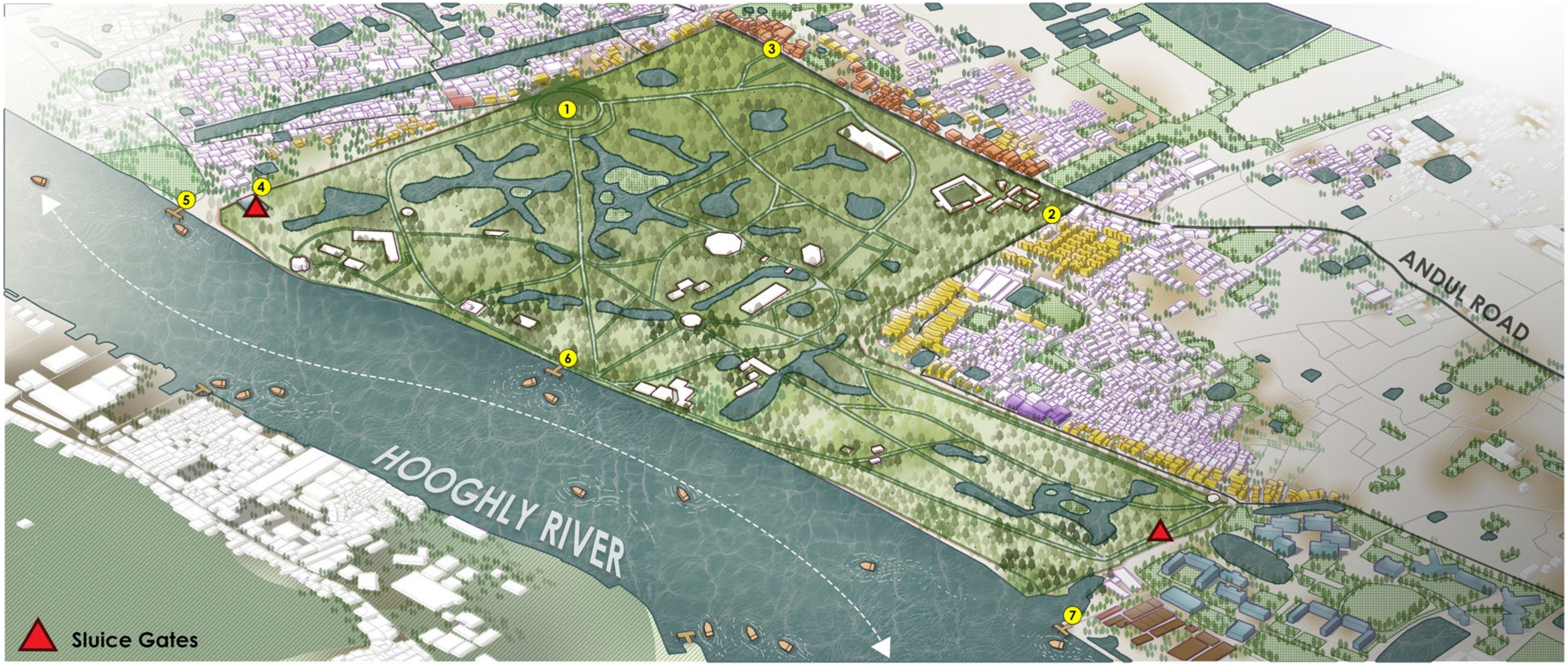


BOTANICAL GARDEN | LOCATION DETAILS

1. The Great Banyan Tree

2. Main Gate

3. Andul Road Gate



4. Najirgunge Gate

5. Najirgunge Ferry Ghat

6. River View Gate & Ferry

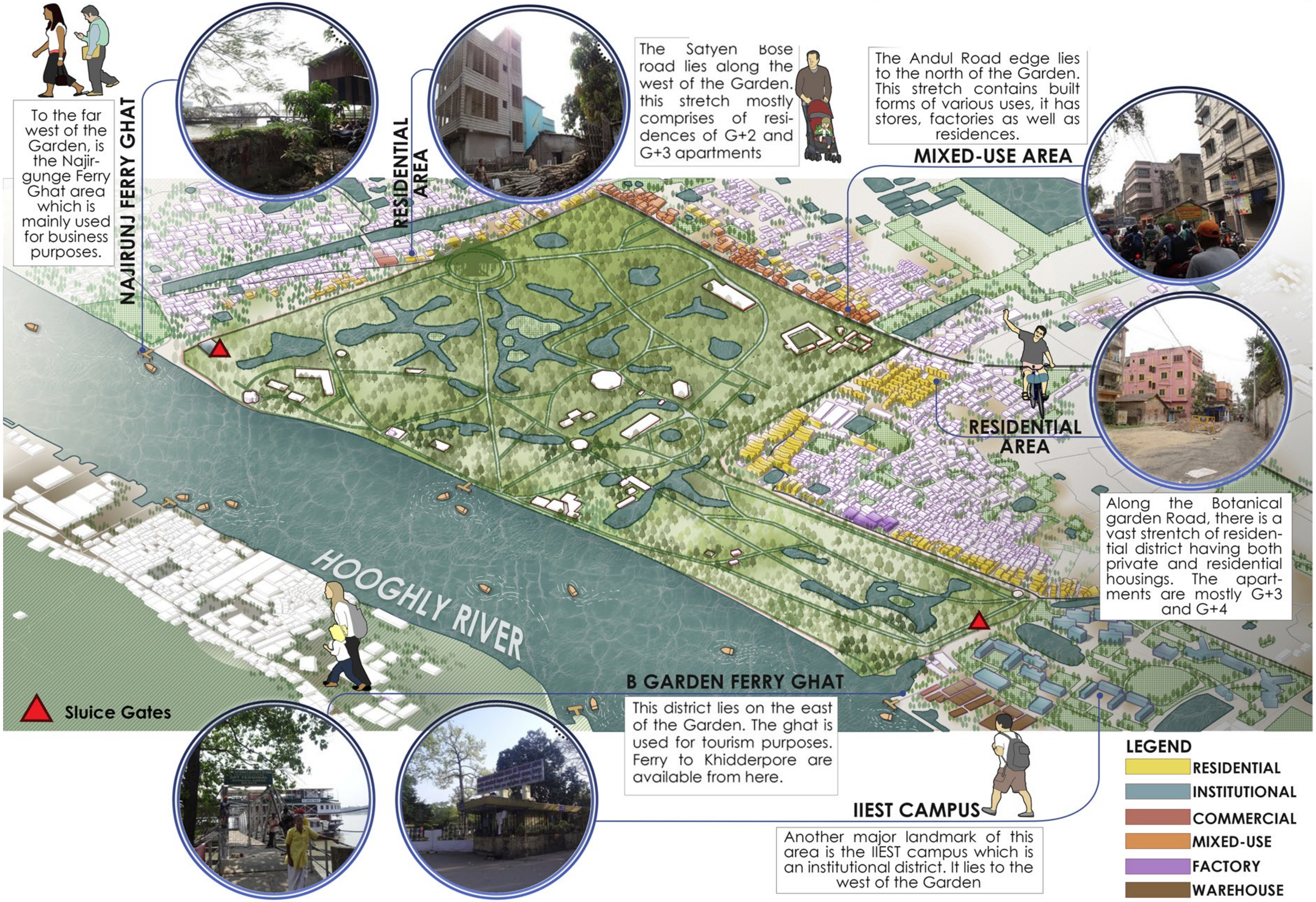
7. B Garden Ferry Ghat

LEGEND

🟨	RESIDENTIAL
🟦	INSTITUTIONAL
🟥	COMMERCIAL
🟧	MIXED-USE
🟪	FACTORY
🟫	WAREHOUSE

BOTANICAL GARDEN I

EDGE DETAILS



NAJIRUNJ FERRY GHAT

To the far west of the Garden, is the Najirgunge Ferry Ghat area which is mainly used for business purposes.

RESIDENTIAL AREA

The Satyen Bose road lies along the west of the Garden. this stretch mostly comprises of residences of G+2 and G+3 apartments

MIXED-USE AREA

The Andul Road edge lies to the north of the Garden. This stretch contains built forms of various uses, it has stores, factories as well as residences.

RESIDENTIAL AREA

Along the Botanical garden Road, there is a vast strentch of residential district having both private and residential housings. The apartments are mostly G+3 and G+4

B GARDEN FERRY GHAT

This district lies on the east of the Garden. The ghat is used for tourism purposes. Ferry to Khidderpore are available from here.

IIEST CAMPUS

Another major landmark of this area is the IIEST campus which is an institutional district. It lies to the west of the Garden

LEGEND

- 🟨 RESIDENTIAL
- 🟦 INSTITUTIONAL
- 🟥 COMMERCIAL
- 🟧 MIXED-USE
- 🟪 FACTORY
- 🟫 WAREHOUSE

BOTANICAL GARDEN

TOPOGRAPHY

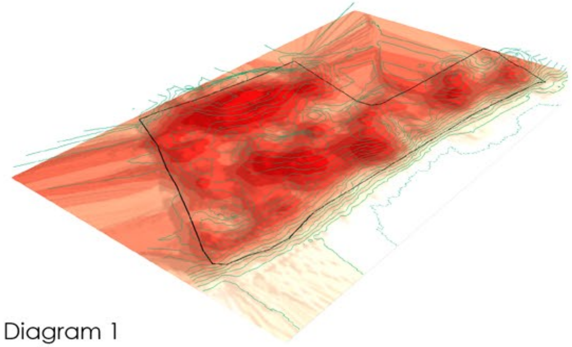


Diagram 1

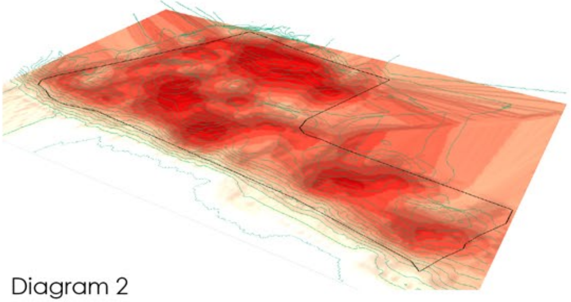


Diagram 2

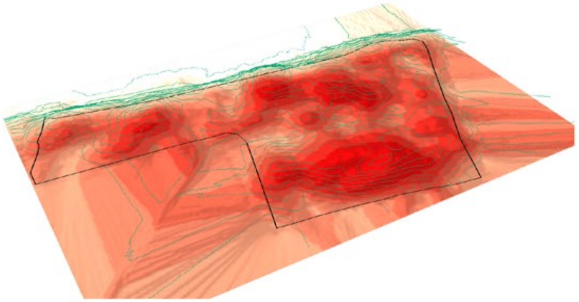
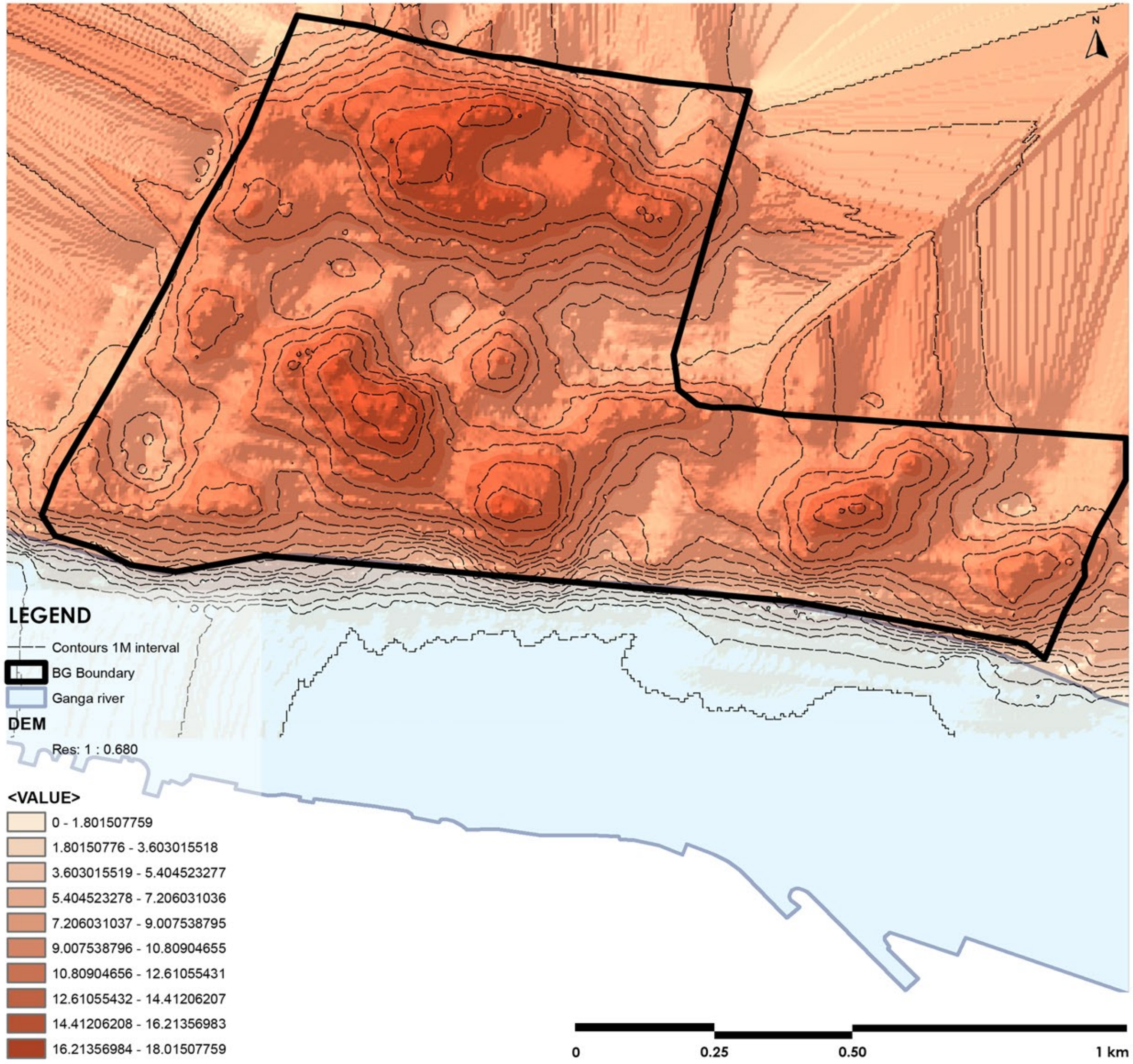


Diagram 3

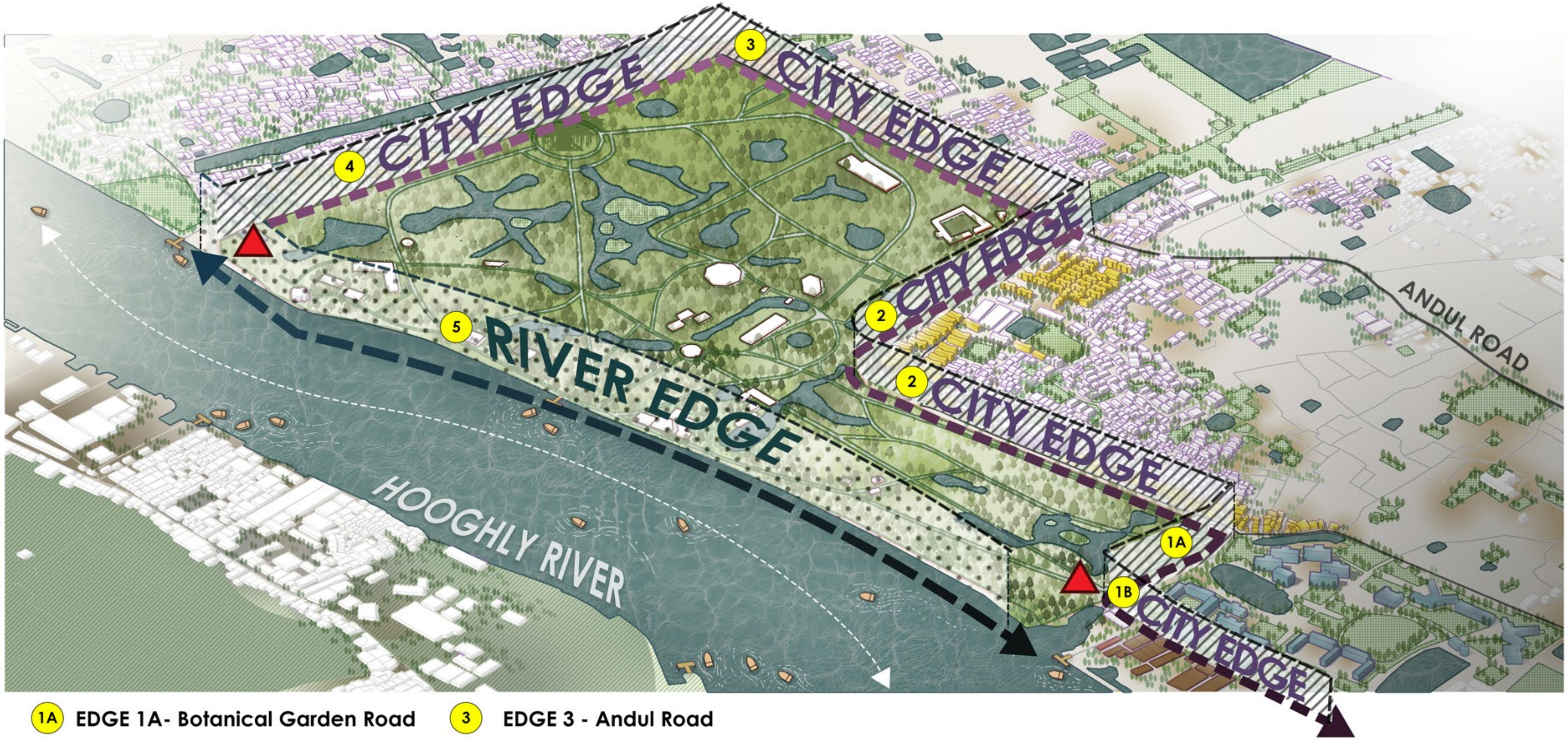


BOTANICAL GARDEN I | EDGE DETAILS

░ City Edge

▲ Sluice Gates

▨ River Edge



(1A) EDGE 1A- Botanical Garden Road

(1B) EDGE 1B- Lower Foreshore Road

(2) EDGE 2 - Botanical Garden Road

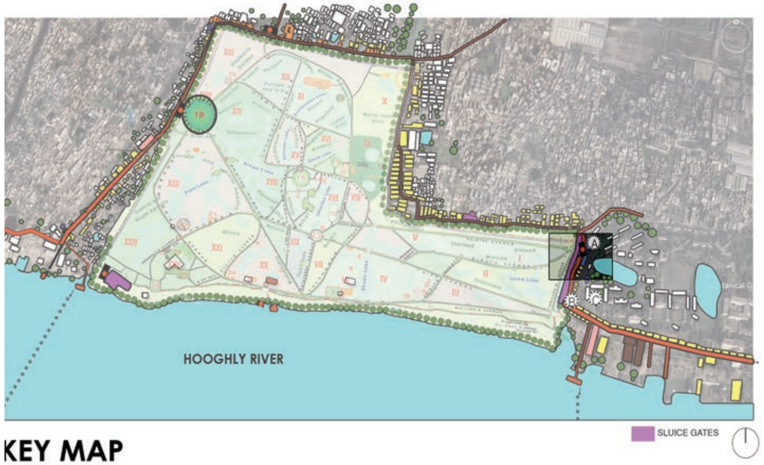
(3) EDGE 3 - Andul Road

(4) EDGE 4 - Satyen Bose Road

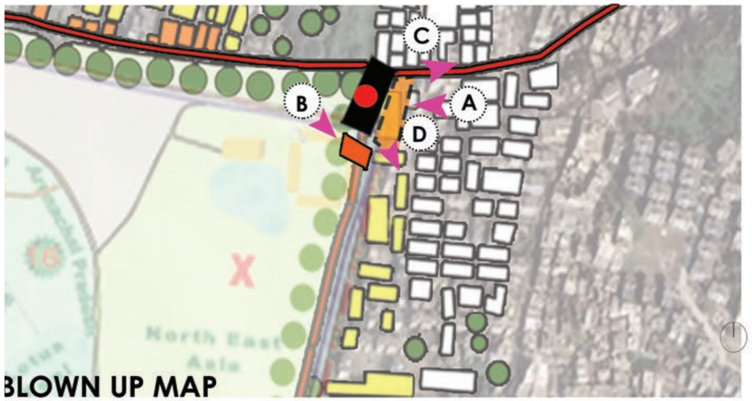
(4) EDGE 5 - River Edge

GATES OF THE GARDEN

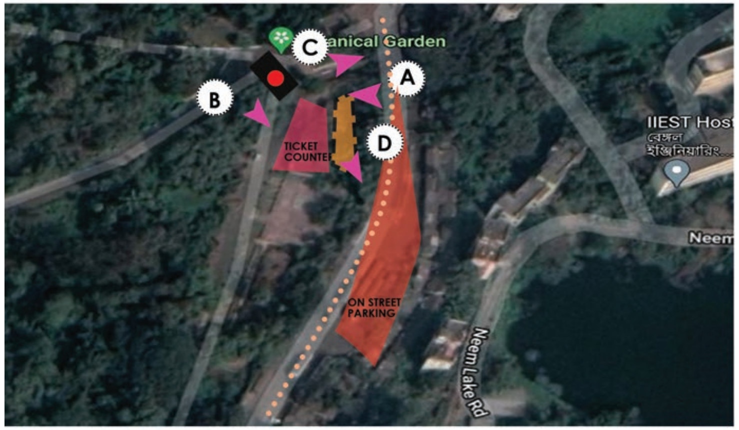
BOTANICAL ROAD GATE 1 | OPERATING GATE 1



KEY MAP



BLOWN UP MAP



GOOGLE MAP SHOWING GATE, TICKET COUNTER & ON ROAD PARKING

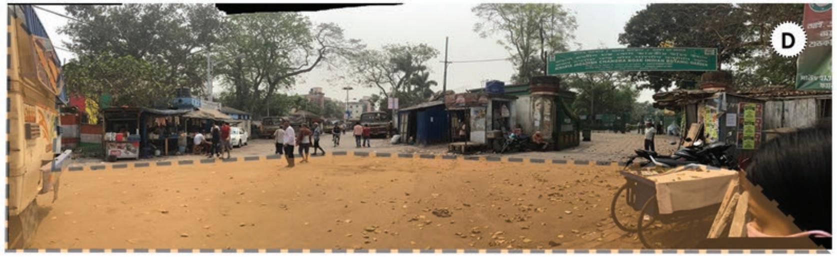
GATE 1, The Main gate of The Botanical Garden, is approached through the Botanical Garden Road.
The gate is easily visibile and acts as the most prominent landmark of the area. Lots of road side stalls are present which have encroached on the road.

Abscence of designated parking spaces for buses and other vehicles result in on road parking consequentially leading to congestion in front of the gate and it's surroundings.
A public washroom is located with 10 M radius of the Botanical Garden Main gate.

The Main Gate of the garden as seen from the approach road. A small refreshment shop is present just beside the gate.

The ticket counter is present beside the gate just at the entrance.

The main approach road is the Botanical Garden Road which extends to College Road and upto Shibpur.



On street parking of buses and other vehicles hamper movement in the area and reduce its visibility
A Public washroom and Bus stop are present within 10m radius.

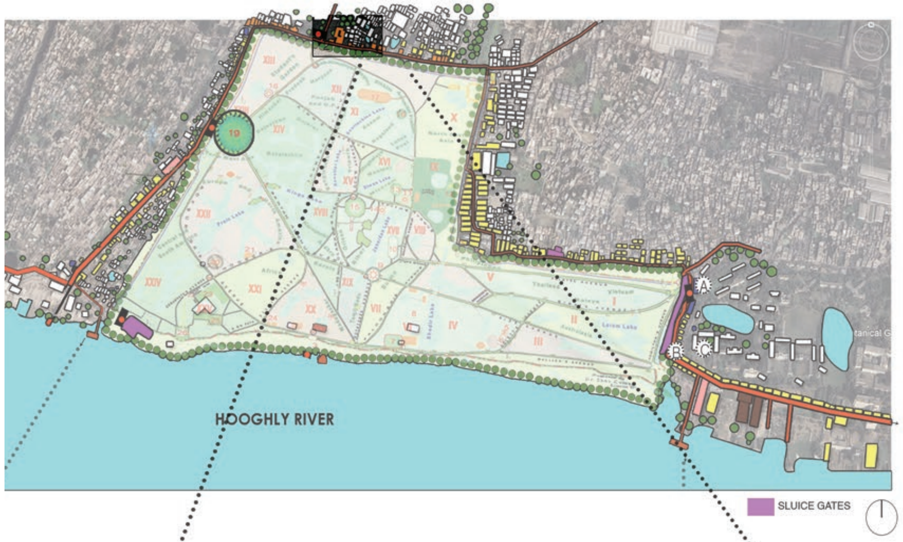
▭ **AREA USED FOR BUS PARKING**

GATES OF THE GARDEN

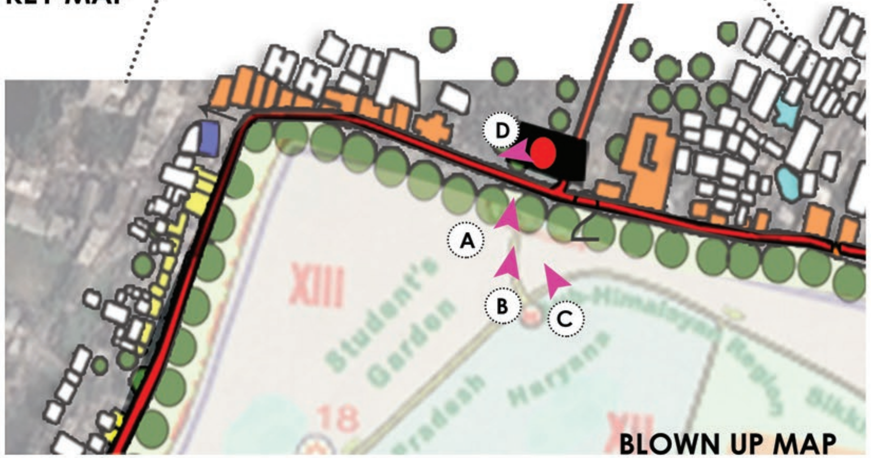
ANDUL ROAD GATE | OPERATING GATES 2

The Andul Gate opens on the Andul Road which is about 7M wide.
Mostly heavy vehicles like trucks run on this road along with Cars and a major traffic of Two wheelers.A Petrol pump is present right opposite to it.
The road is congested and doesnt have any proper footpath which makes Pedestraian movement through this road unsafe.

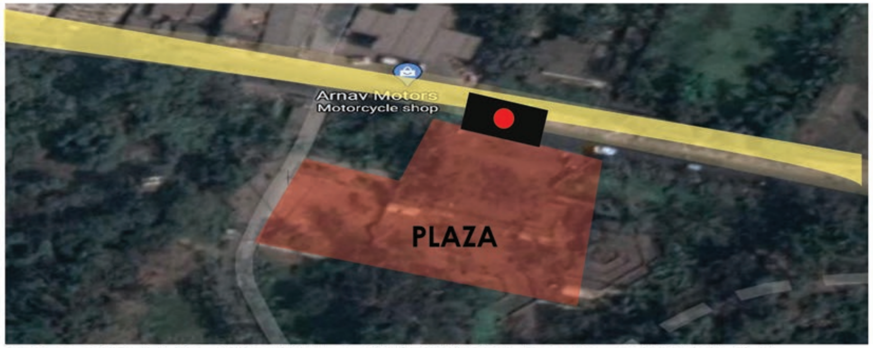
The boundary of the Botanical Gardens runs on the left side of the road while small scale commercial buildings and stores line the right.
It leads to the Satyenbose road which can be used to approach the Najirgange Ferry Ghat.



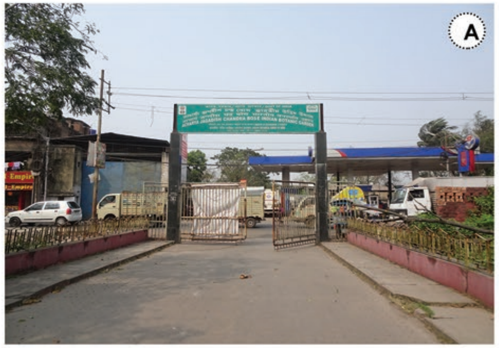
KEY MAP



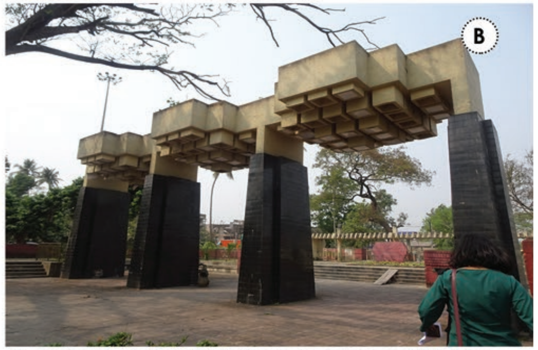
BLOWN UP MAP



GOOGLE MAP SHOWING THE ANDUL ROAD GATE PLAZA



The Andul Gate is an exit gate only. Entry is not allowed. This is situated in the Andul road.



A grand gate structure is present just in front of the plaza.

The left side is flanked by the boundary wall and the right side by small scale commercial shops.

After the smaller gate, a small plaza is present which leads to the exit gate.

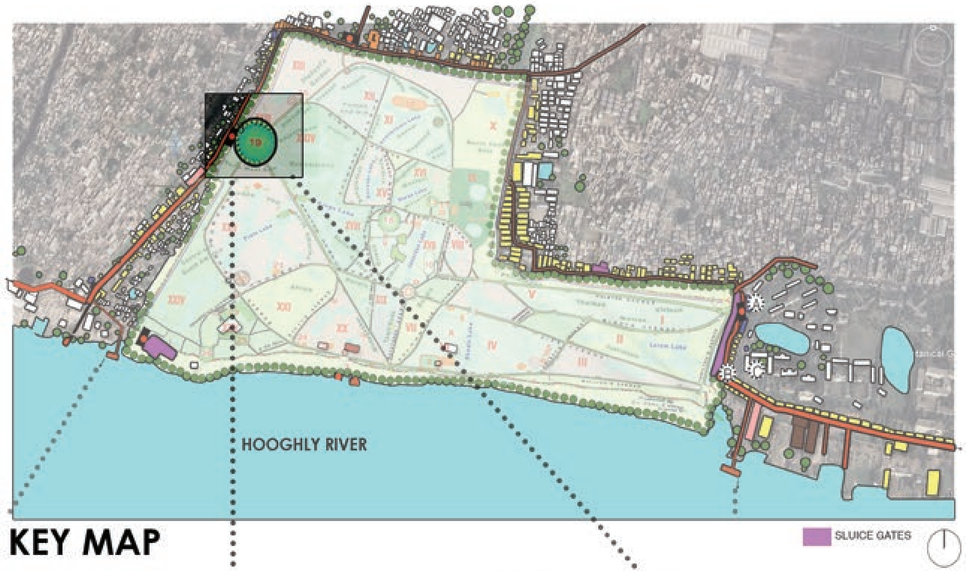
GATES OF THE GARDEN

SATYENBOSE ROAD GATE | NON OPERATING GATE

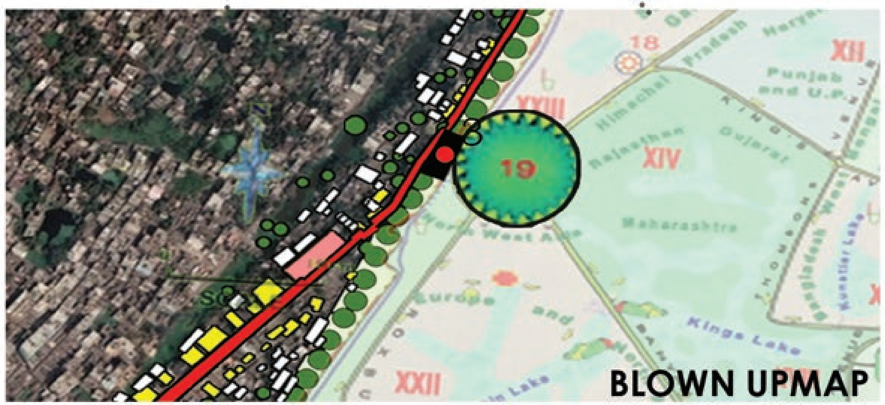
The Banyan Tree gate used to be the main gate of the garden which opened towards the Satyen Bose Road.

The Banyan tree is the primary landmark of the garden and this gate was the main entry gate at one time.

But this gate has now been closed off since the Satyen Bose Road is narrow and congestion is a major problem along this road.

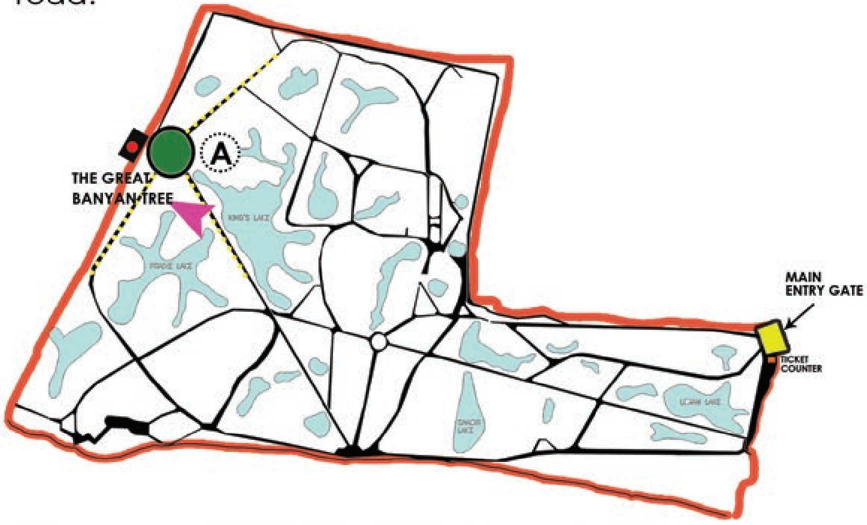


KEY MAP

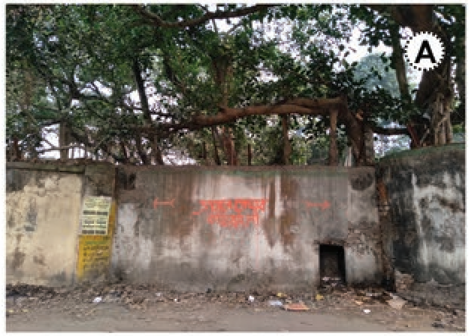


BLOWN UPMAP

GOOGLE MAP SHOWING GREAT BANYAN TREE



INTERNAL LAYOUTOF BOTANICAL GARDEN



The Banyan tree acts as a major landmark since all streets end on this node.

The Banyan tree gate used to be a major gate but now it has been closed off due to congestion.

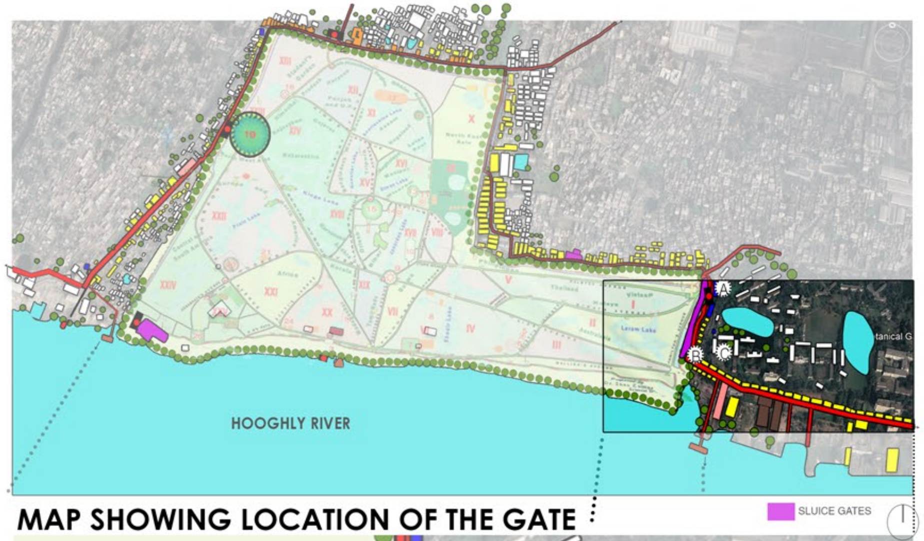
GATES OF THE GARDEN

LOWER FORESHORE ROAD | NON-OPERATING GATES

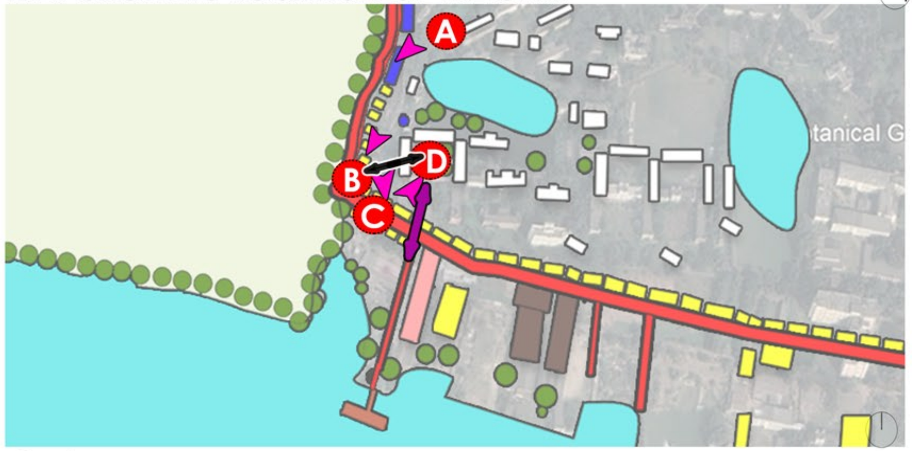
The original entry to the Botanical Garden is now closed off. Squatter settlements along the edge have totally encroached the gate.

The magnificant structure is now barely visible due to the temporary houses in front of it.

Interestingly, a gate which belongs to the IIEST campus is located just opposite to this gate. Originally, the university campus and the garden were linked together through these gates, but now both of these are closed off



MAP SHOWING LOCATION OF THE GATE



CONNECTION BETWEEN THE BESU AND CLOSED GATE
CONNECTION BETWEEN THE BESU AND THE FERRY GHAT

This gate forms an important link with the IIEST campus which lies just at the opposite side. As shown on the map, it is understood that the campus was once linked with the garden via this gate.

The IIEST campus gate also leads the way to the Botanical Ferry Ghat and hence it was once possible to access both the Ferry ghat which lies to the west of the gate, and the Botanical Garden to the east.

It may be noted that, after the gates were closed off and a new road was constructed, squatter settlements sprang up within this area.

The approach road to this gate is the Botanical Garden Road

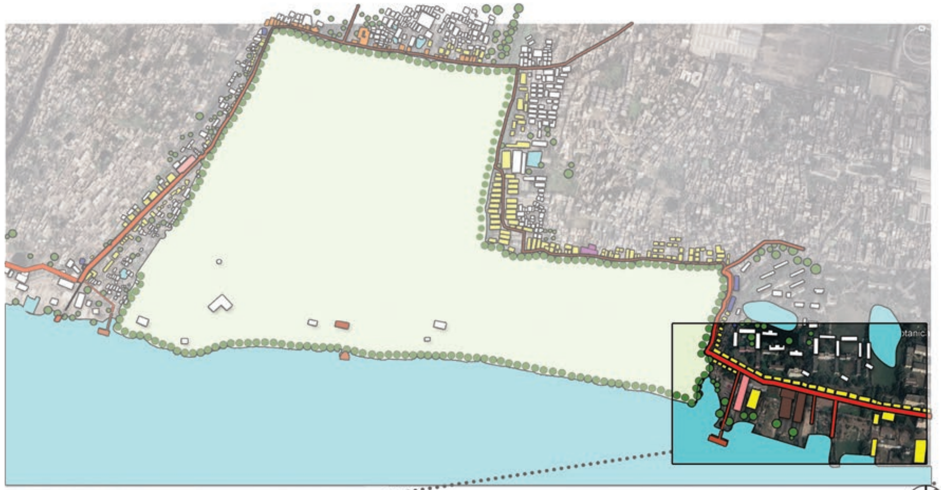
The structure of this gate which is totally encroached by the temporary settlements and is barely visible

Just beside the original gate, at one point the boundary wall is low in height, and a view of river can be seen.

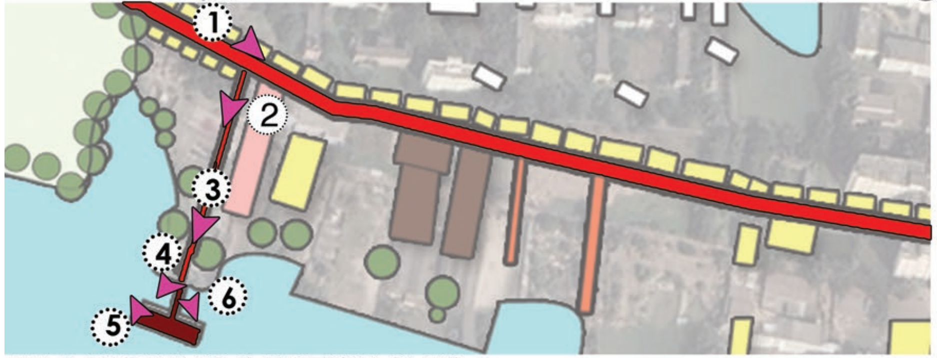
The IIEST gate is now closed off. This gate linked the campus with the Botanical Garden. This gate belongs to the oldest part of the campus.

FERRY GHAT

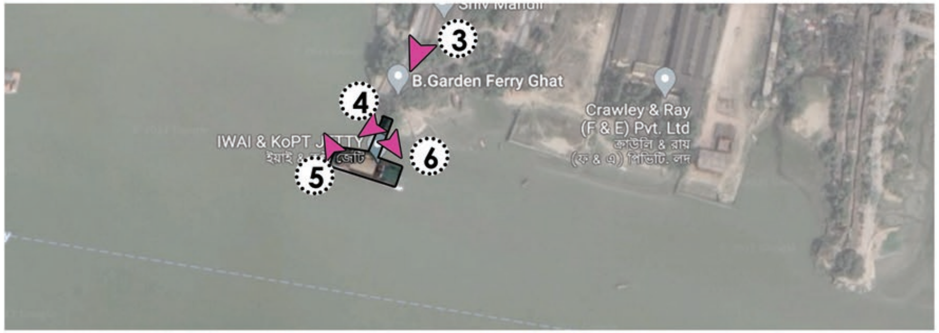
B. GARDEN FERRY GHAT ▯OPERATING FERY GHA



KEY MAP



MAP SHOWING THE FERRY GHAT



GOOGLE EARTH MAP SHOWING THE FERRY GHAT

FERRY GHAT B: MAINLY USED FOR TOURISM PURPOSE

B.Garden Ferry ghat is located is within 50m radious of Botanical Garden main gate.

Approached by the Foreshore Road, it is majorly a ferry ghat used by tourist and isnt as congested as th Najirganje Ferry Ghat.

An array of mangroves planted in the Botanical Garden is visible from this ferry ghat. The shipyard of metiaburuj , the Najirgange Ferry Ghat jetty and an non operationg ferry ghat of Botanical Garden is visible from here.

A sluice gate was present on the right side of the Ferr ghat but now it doesnt work.

The ghat is not well maintained.

The major road to the Ghat is under construction making movement problematic.

The approach road to the ghat is comparitively easier to navigate.

The Botanical Garden Ferr Ghat gate. Mainly used fo tourism purposes.

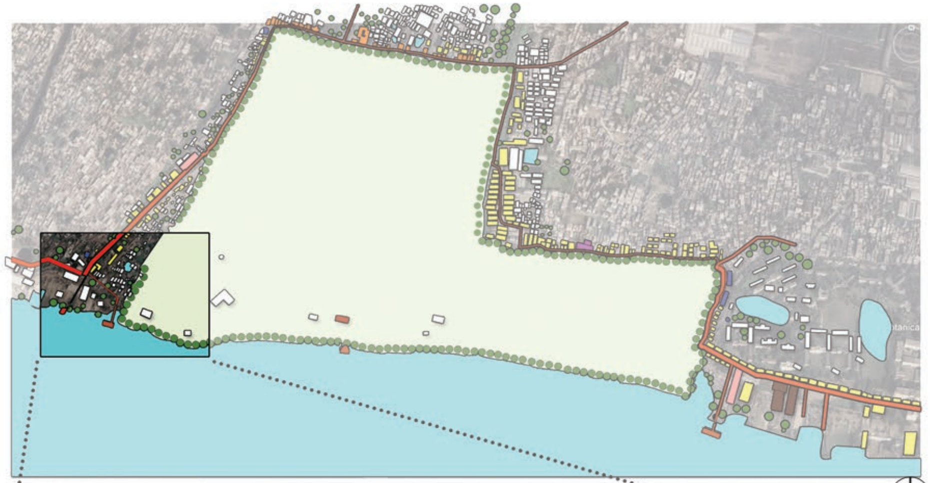
On the right hand side of the Ferry ghat there is a lock gate. The shipyard near Najirganj Ferry ghat is visible from here.

An array of Mangrove trees have been planted in the Botanical Garden which can be seen from the Botanical Garden Ferry Ghat.

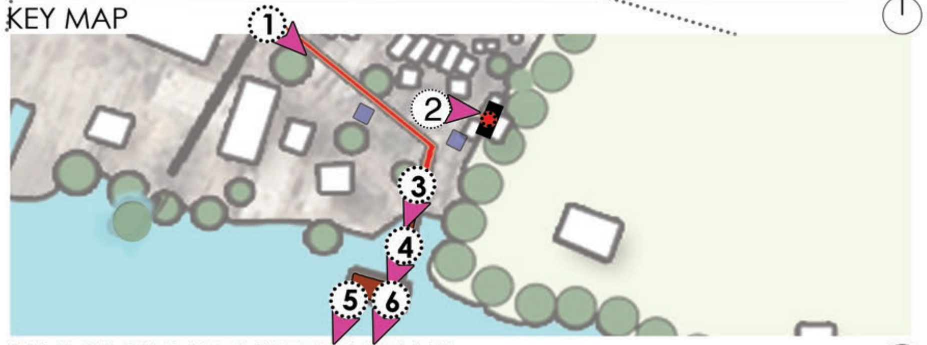
On the left side of the ferr ghat is a platform which coulc act as a viewpoint but it isn maintained properly.

FERRY GHAT 2

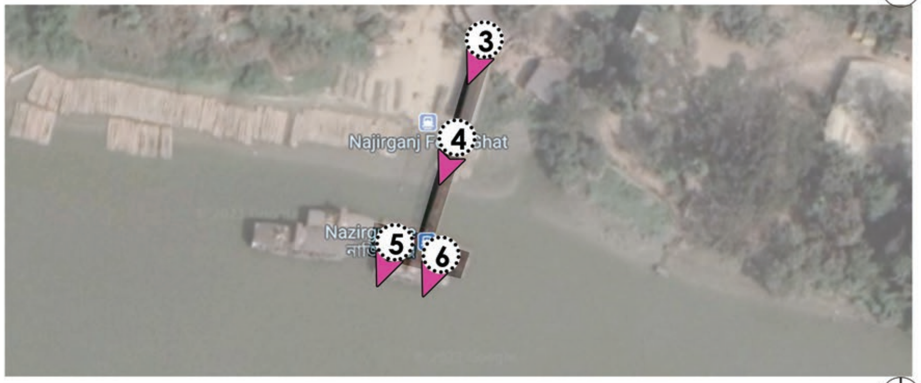
NAJIRGUNGE FERRY GHAT | OPERATING FERY GHAT



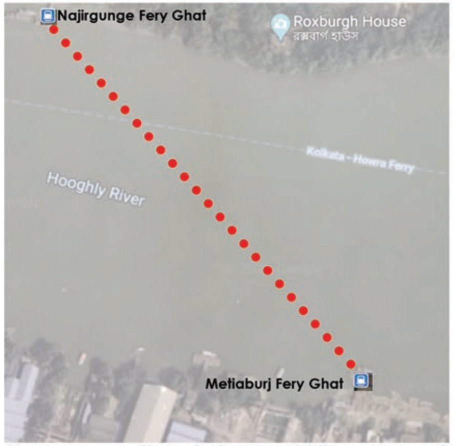
KEY MAP



MAP SHOWING THE FERRY GHAT



GOOGLE EARTH MAP SHOWING THE FERRY GHAT



Ferry connection between Najirgunge and Metiaburj Ferry ghats

The Najirgunge Ferry Ghat gate is approached through the Satyen Bose road which has a width of about 3.5m.

The Ferry Ghat itself is a hub of activities owing to the wholesale Haat of Najirgange and Metiaburuj which takes place on every weekend.

The Ferry Ghat area has a Mosque and a Temple. The space in front of the mosque is used extensively for 2-wheeler parking and the revenue hence genetrated goes towards the maintainance and upkeep of the Mosque.

The **Najirgunge Gate** of the Botanical garden is located near this area but remains closed due to security reasons.

The Approach road to the Ghat is lined with makeshift stalls on weekends, which occupies most of the road space.

The sealed gate is located adjacent to the ghat and is almost hiden from view by the extensive 2-wheeler parking.

This marks the entry to the Ferry Ghat. It is extremely congested with people coming from various places.

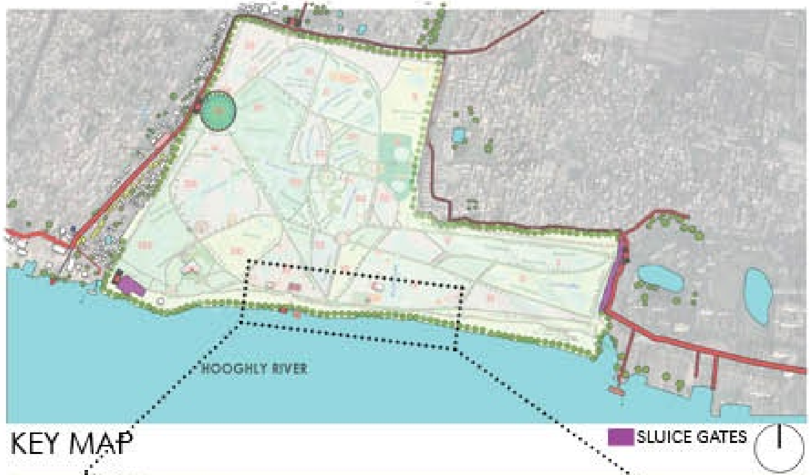
This shed is situated just after the primary entrance. From here, the 2-wheeler parking starts.

A bridge is present along with the ghat which connects Metiaburj with Najirgunge. This is extremely important since it acts as a link between the activities of both the ghats.

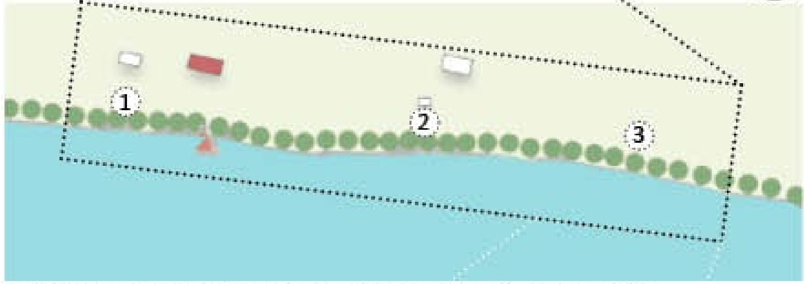
Directly across the Ferry Ghat, a shipyard is present along the Metiaburj Ghat. On the Metiaburj sde, a haat takes place on every weekend

RIVERSIDE GATES

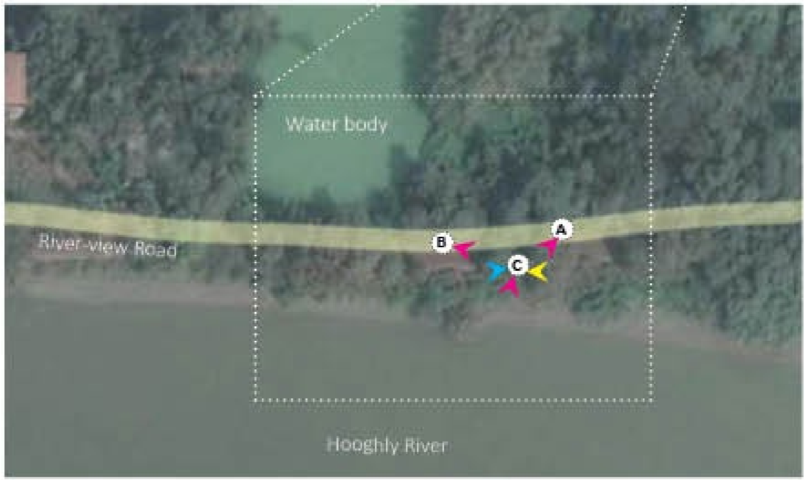
RIVER-VIEW GATE 3 | NON-OPERATING



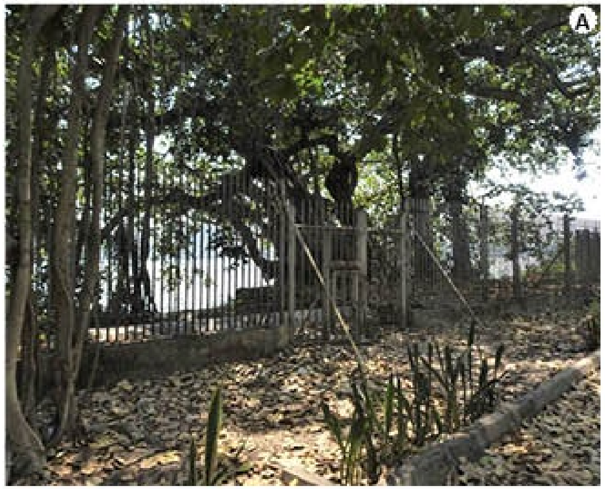
KEY MAP



MAP OF THE RIVER-VIEW ROAD OF B. GARDEN



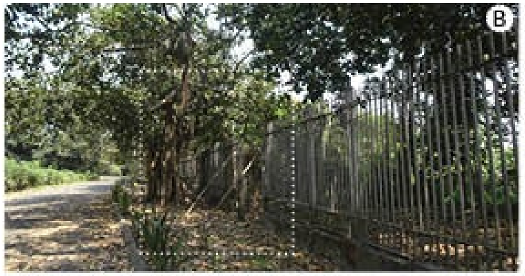
MAP SHOWING RIVER-VIEW GATE 3



Easternmost gate along The river-view road of Botanical garden. There is no maintenance here. This gate hard to notice. Overgrowth of unwanted plants hinders visibility from this gate.

Partial view of the CESC Factory on the opposite bank of Hooghly river from the gate. (right)

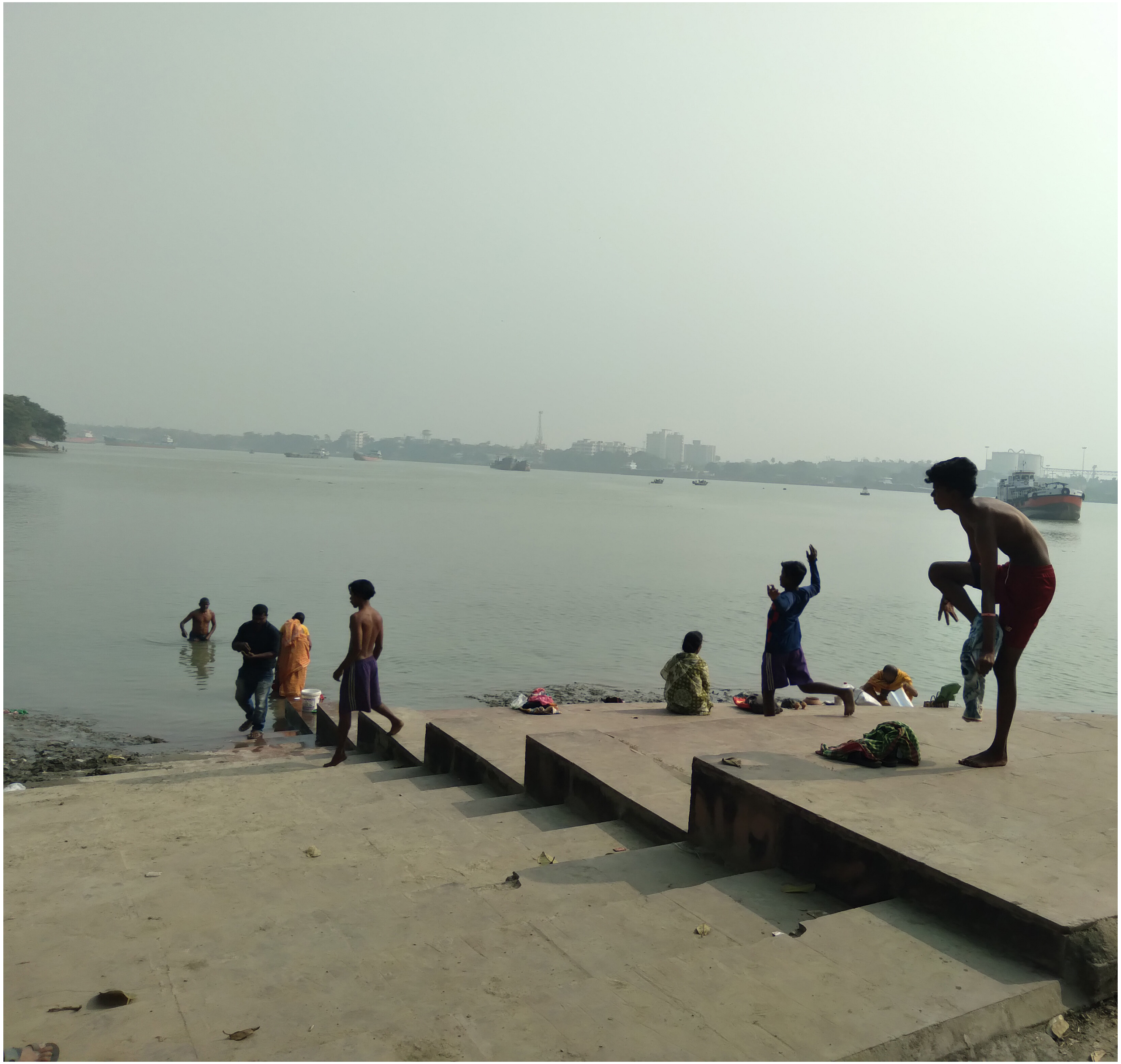
The gate as seen from the riverside road of Botanical Garden, looking east. (bottom)



View from the other side of the gate, looking west. The iron gate and the boundary wall is severely rusted.

Looking south through the gate. The river is hardly visible due to overgrowth of unwanted vegetation.

Looking east, from the other side of the gate. There is no maintenance of this part of the boundary wall and river edge. The river cannot be seen.



A view of children bathing at the east Shibpur Ghat.

Condition Survey and Interpretations

Dr. Neet Das

The Company's Botanic Garden was established at Sibpur near Kolkata, in 1787 by Colonel Robert Kyd, 'not for the purpose of collecting rare plants (altho' they also have their use) as things of mere curiosity…but for establishing a stock for the disseminating such articles (as) may prove beneficial for the inhabitants [of India], as well as Natives of Great Britain and ultimately may tend to the Extension of the National Commerce and Riches.' Kyd also recognised a strong humanitarian justification for the garden as it was hoped that the promotion of new crop varieties would help avert 'dreadful visitations' of 'the greatest of all calamities, that desolation [caused by] Famine and Subsequent Pestilence.'

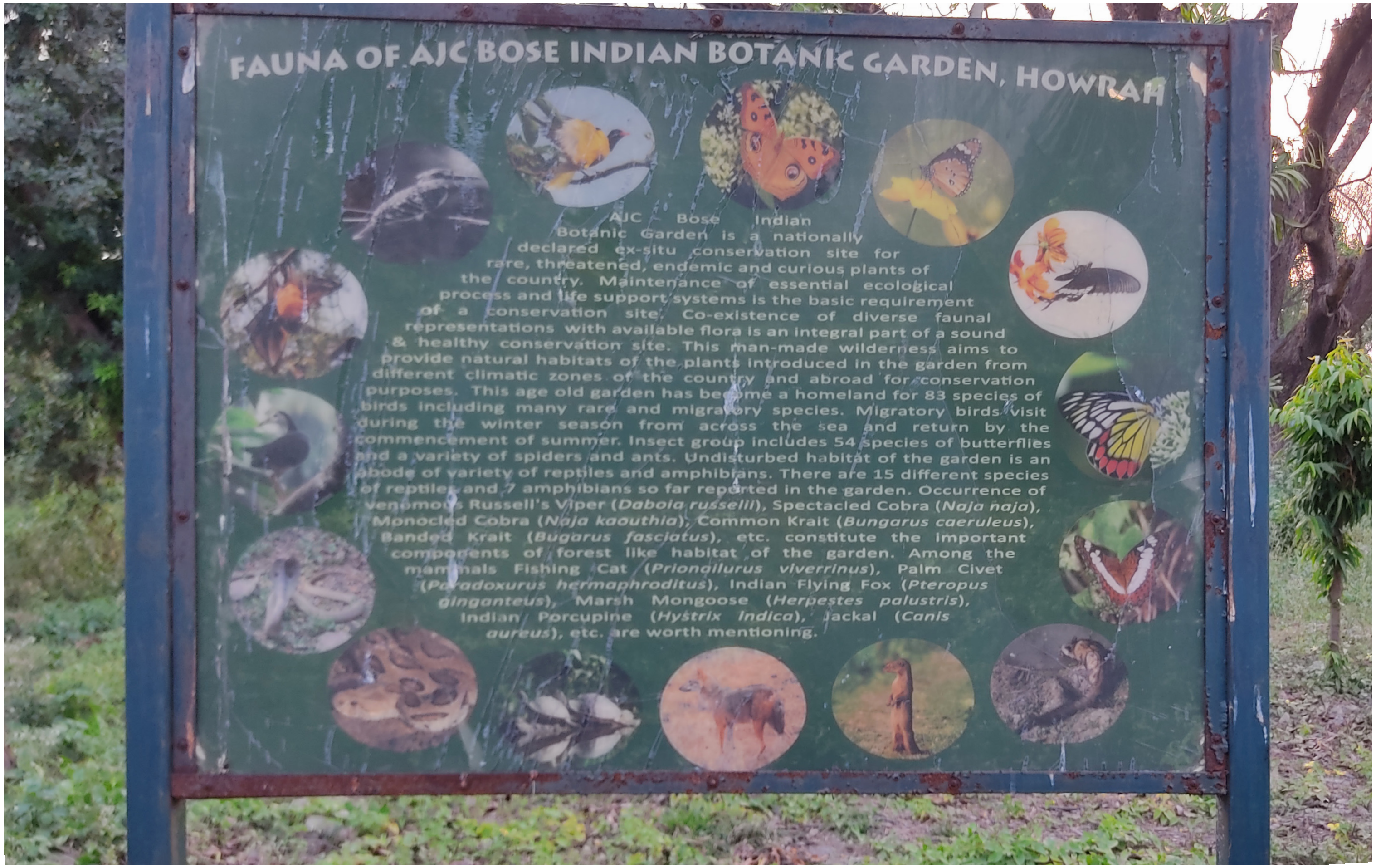
By 1817, the vision of the Calcutta Botanic Garden, under Nathaniel Wallich, in addition to the above, became a public pleasure ground- an elegant space for the instruction and entertainment of the growing European population of the capital of British India, a place to picnic and to promenade. With the changing political sentiments, the vision was again modified by William Griffith in 1843 from 'seeking to understand and learn from India, to seeing it as a place lacking in civilised virtue and needing to be properly ordered.' Griffith re-ordered the garden to read as 'a botanical class book.' (Richard Axelby, Calcutta Botanic Garden and the colonial re-ordering of the Indian environment.)

A post independent publication (undated, post 1992) by the Botanic Survey of India elaborates the roles of a Botanic garden including better understanding of plant species, growing economic plants, serving as a living repository of native and exotic plants, conducting research for conservation of rare species and for horticulture. BSI also envisages generating public awareness and creating environmental awareness as their objectives. Although the BSI has laid out these roles, there is an urgent need for the organisation to revisit their objectives and develop a strong vision aiming towards the needs of the present and future generations.

Left: The lakes have been used in the past for boating by tourists.

Right Small bridges have been constructed to cross over the lakes.

As one approaches the Botanic Garden from the bridge, there is no signage to indicate the direction to the garden. And as one enters, an old map, indicating the various plant section is displayed in many places. However, other than the roads, it is difficult to find any more information on site. Signages made in brick and concrete lie un tended and unpainted. Only with a little effort and barely any expenditure, these could be re-painted to give a better visitor experience. Although the BSI has a functional website, an e-library, and a geo tagging for the iconic trees, it would be useful to promote them on social media, which can popularise the value of the gardens among the younger generations. More awareness programs can be organised for the dissemination of the vast resource material already existing within the Botanic Garden. None of these activities require large sums of money but will go a long way in revitalising the Garden.



FAUNA OF AJC BOSE INDIAN BOTANIC GARDEN, HOWRAH

AJC Bose Indian Botanic Garden is a nationally declared ex-situ conservation site for rare, threatened, endemic and curious plants of the country. Maintenance of essential ecological process and life support systems is the basic requirement of a conservation site. Co-existence of diverse faunal representations with available flora is an integral part of a sound & healthy conservation site. This man-made wilderness aims to provide natural habitats of the plants introduced in the garden from different climatic zones of the country and abroad for conservation purposes. This age old garden has become a homeland for 83 species of birds including many rare and migratory species. Migratory birds visit during the winter season from across the sea and return by the commencement of summer. Insect group includes 54 species of butterflies and a variety of spiders and ants. Undisturbed habitat of the garden is an abode of variety of reptiles and amphibians. There are 15 different species of reptiles and 7 amphibians so far reported in the garden. Occurrence of venomous Russell's Viper (*Daboia russelii*), Spectacled Cobra (*Naja naja*), Monocled Cobra (*Naja kaouthia*), Common Krait (*Bungarus caeruleus*), Banded Krait (*Bugarus fasciatus*), etc. constitute the important components of forest like habitat of the garden. Among the mammals Fishing Cat (*Prionailurus viverrinus*), Palm Civet (*Paradoxurus hermaphroditus*), Indian Flying Fox (*Pteropus ginganteus*), Marsh Mongoose (*Herpestes palustris*), Indian Porcupine (*Hystrix Indica*), Jackal (*Canis aureus*), etc. are worth mentioning.

Left: An old biodiversity signage in the Botanic Garden.

Right: Concrete signage markers can be easily re-painted with little extra cost.

POLICE FARI
NO ENTRY

Knowing trees I understand the meaning of patience.
Knowing grasses, I can appreciate persistence.
– Hal Borland (1890-1978)

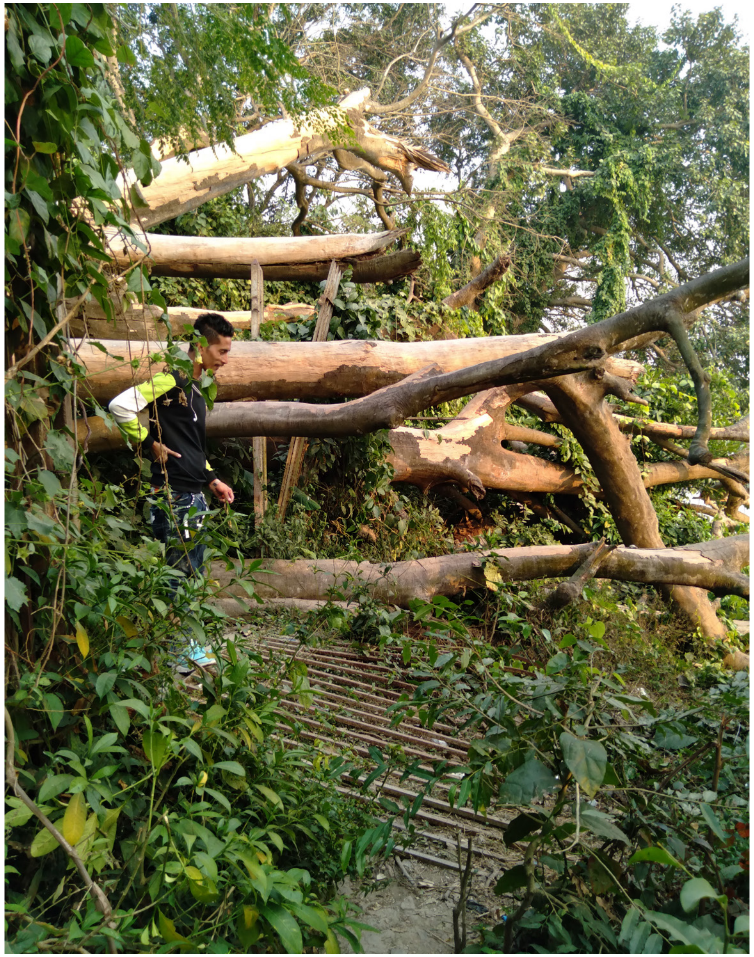
World Ozone Day
The International Day for the Preservation
of the Ozone Layer, 16 September
Central National Herbarium, Botanical Survey of India, Howrah

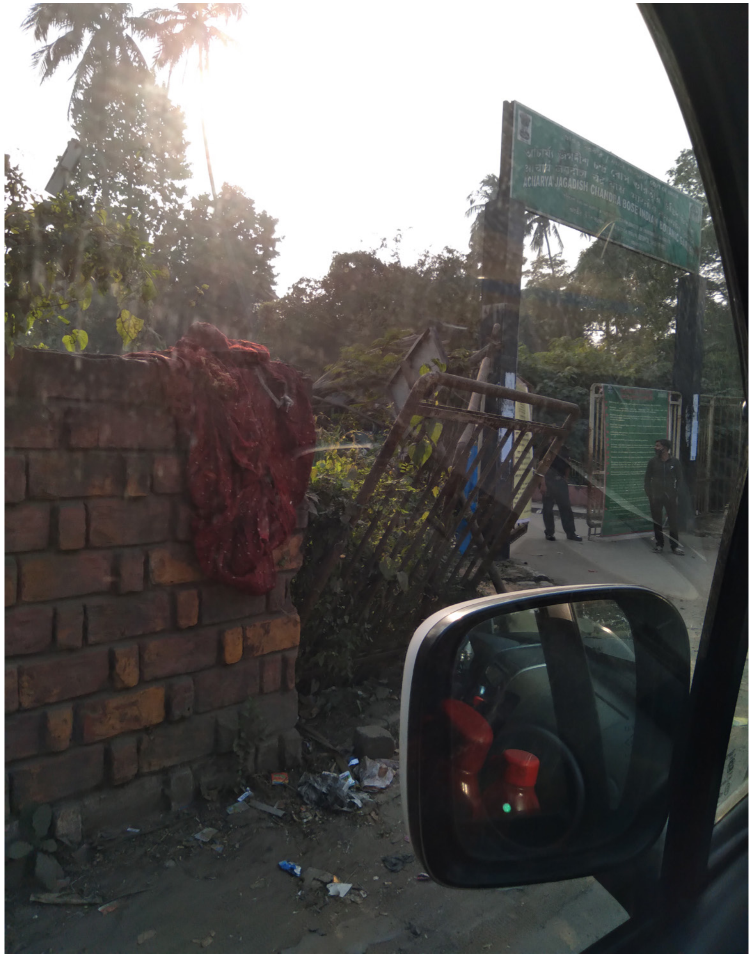
Top: Old signage in the Botanic Garden.
(Source: BSI website)

Bottom and Right:Outreach and sensitization programs organized by the BSI in the past.
(Source: BSI website)

Venue
Central National Herbarium
Botanical Survey of India
Howrah 711 103
ATION COURSE
Conservationists
GREEN SKILL DEVELOPMENT PROGRAMME (GSDP)

The second intervention for the revitalisation of the garden would be the repair and maintenance of its infrastructure. The main gate on the Andul Road is damaged and needs to be repaired. Both the entries need proper parking spaces and round about for turning the vehicles. Some portions of the boundary wall on the east side need to be repaired. Large portions of the boundary on the west side needs to be repaired. Part of the grill on the river front is broken and is being breeched by outsiders. The same needs to be repaired.



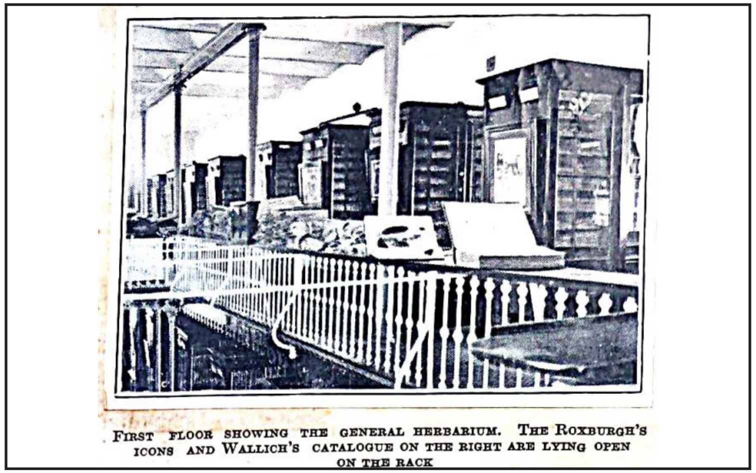


Left: Damaged boundary wall on the east side of the garden.

Right: The damaged iron grill boundary on the west Najirganje Ghat.

Far Right: Damaged Andul Gate entry.

There are many old structures and buildings lying vacant, unused, and in a dilapidated condition. The same could be restored and used for any activity that the BSI proposes. Not only will this save precious money and resources, the old structures will add to the historic charm of the campus.

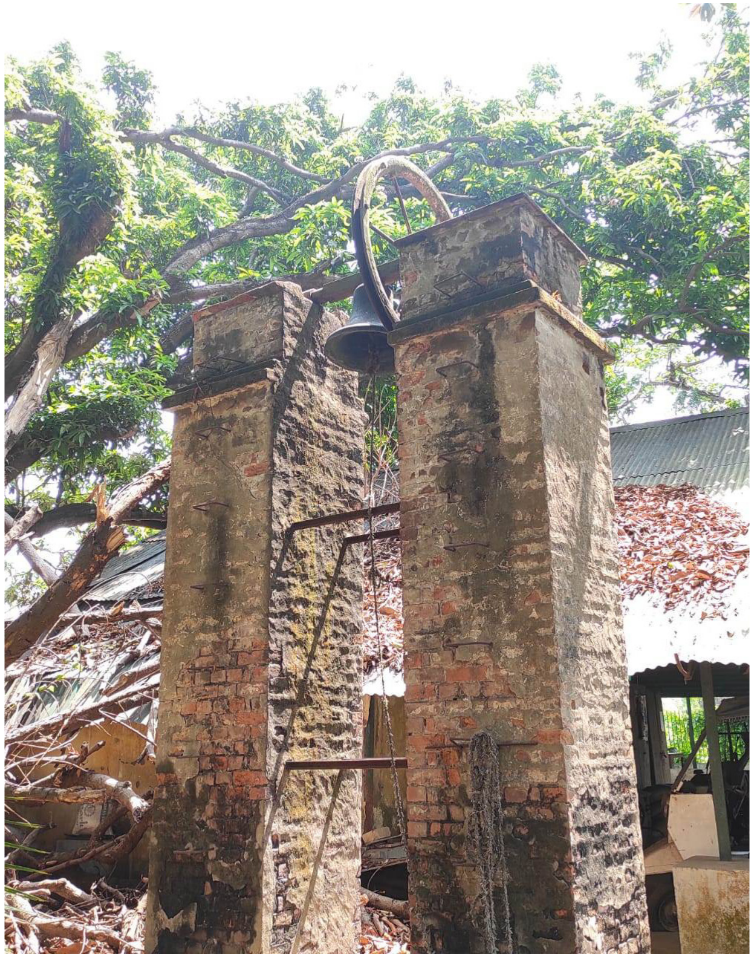


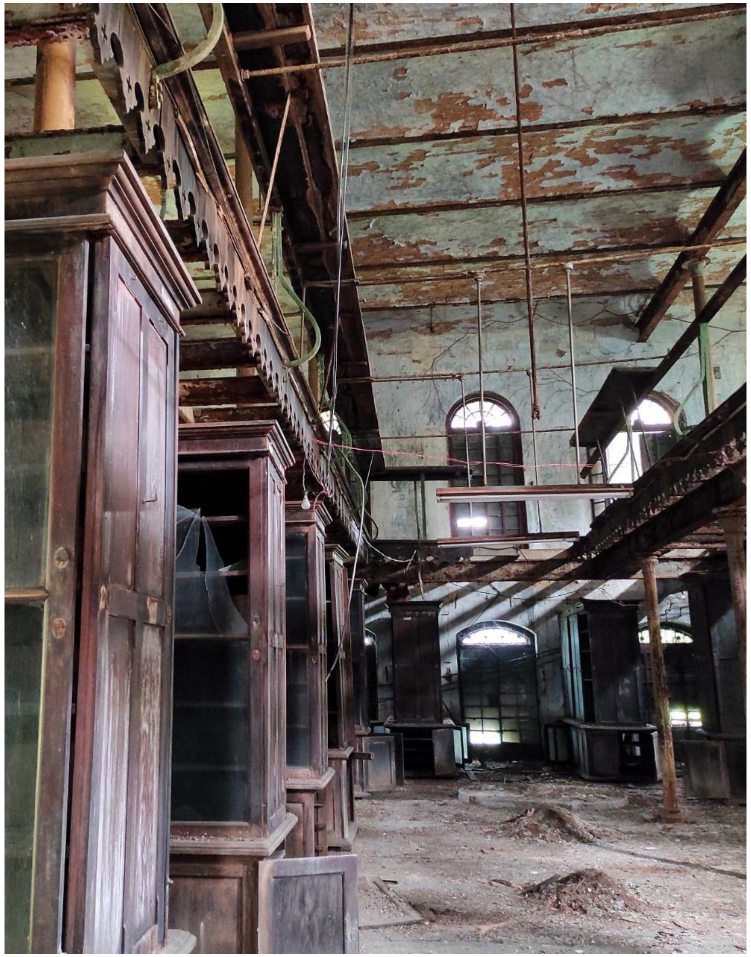
FIRST FLOOR SHOWING THE GENERAL HERBARIUM. THE ROXBURGH'S ICONS AND WALLICH'S CATALOGUE ON THE RIGHT ARE LYING OPEN ON THE RACK

Left: Old Officers building.
(Source: BSI Library)

Far Right: Old Herbarium.
(Source: BSI Library)

Right: Old Well.





The library is a gold mine for researchers. However, currently it is not properly catalogued and difficult to access. Along with the other infrastructure development, development of the library and the herbarium will go a long way in furthering research in various fields.

Facing Page: Visit to the Herbarium.

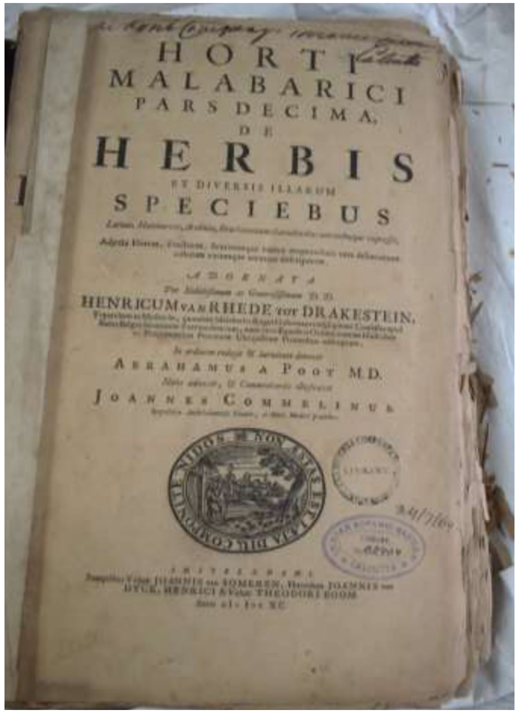
Top Left: The book Horti Malabarici.
(Source: BSI Library)

Top Centre: The book Rariorum Plantarum Historia.
(Source: BSI Library)

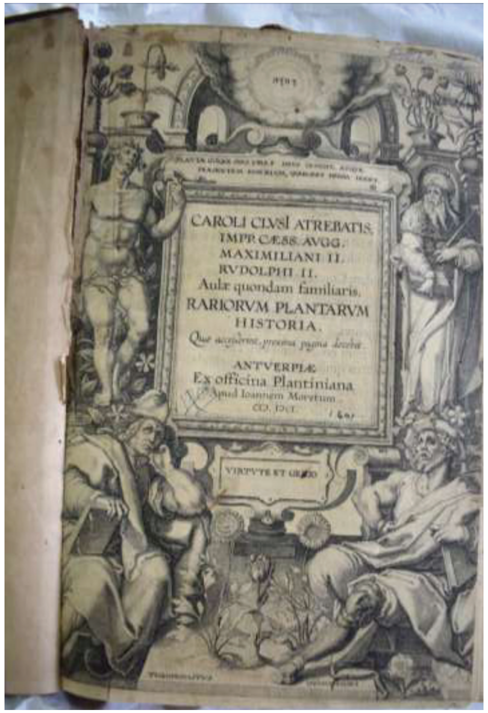
Top Right: Hand Sketches coloured (after published) volume of Rariorum Plantarum Historia published in 1601 CE.
(Source: BSI Library)

Bottom Left: Specimen collected by Roxburgh
(Source: BSI Library)

Bottom Right: Collections of Wallich.

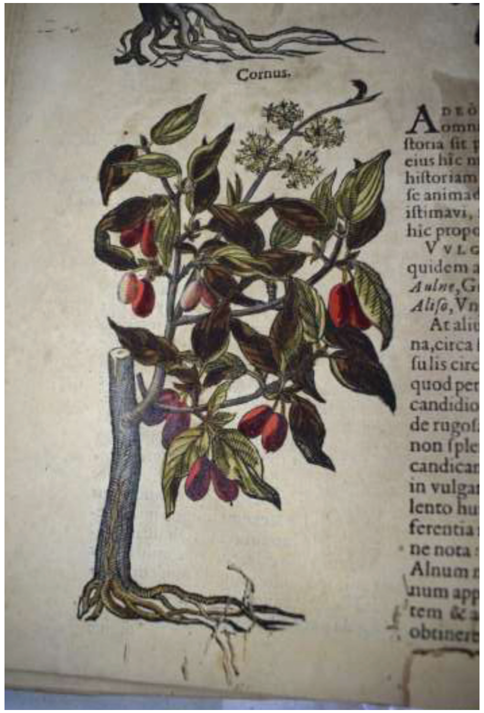


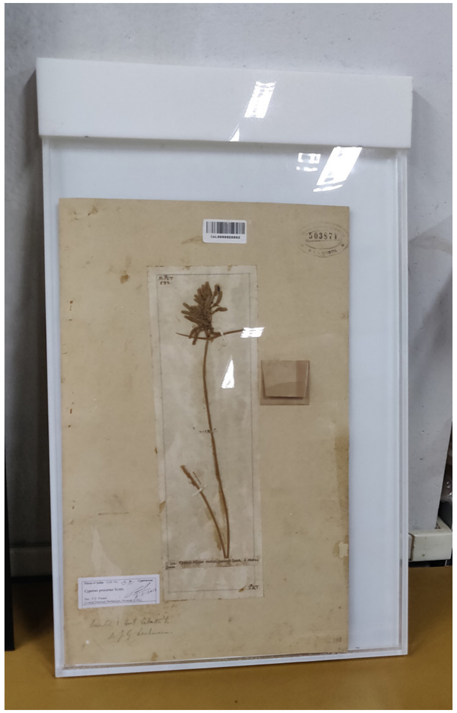
HORTI
MALABARICI
PARS DECIMA,
DE
HERBIS
ET DIVERSIS ILLARUM
SPECIEBUS
ADORNATA
HENRICUM VAN RHEDE TOT DRAKESTEIN,
ABRAHAMUS A POOT M.D.
JOANNES COMMELINUS



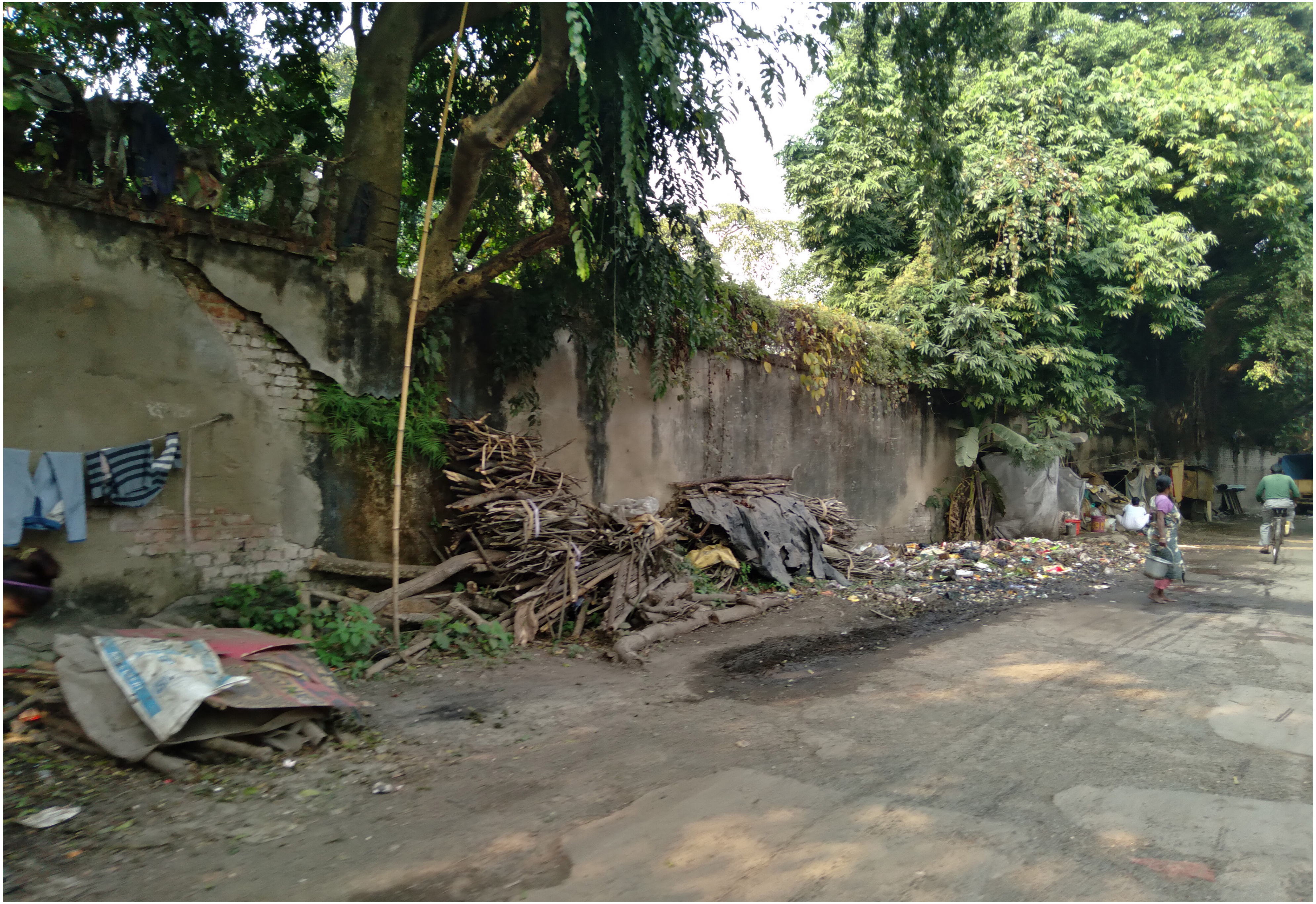
CAROLI CLVSI ATREBATIS,
IMPP. CÆSS. AVGG.
MAXIMILIANI II.
RVDOLPHI II.
Aulæ quondam familiaris,
RARIORVM PLANTARVM
HISTORIA.
Quæ accesserint, proxima pagina docebit.
ANTVERPIÆ
Ex officina Plantiniana
Apud Ioannem Moretum.
CIↃ. IↃCI.

VIRTVTE ET GENIO





Edge

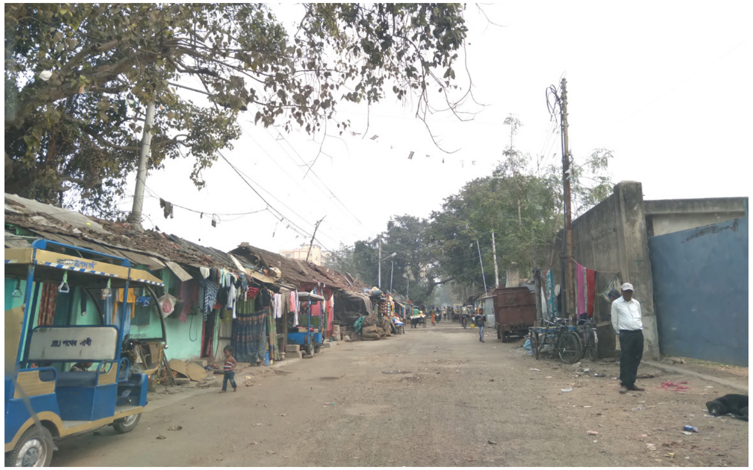


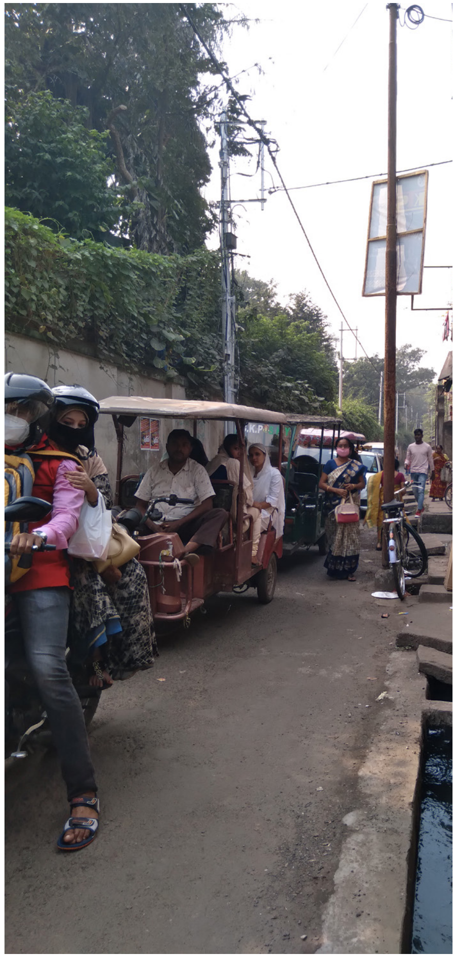
Left: Garbage along the east edge.

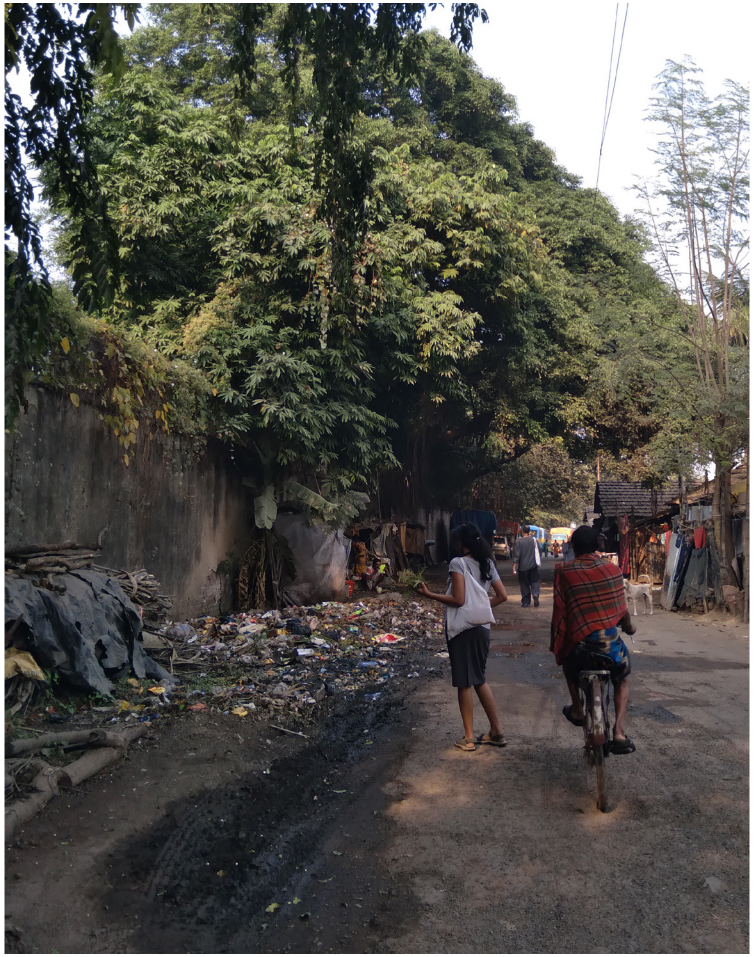
Bottom Left: Heavy traffic on the north edge.

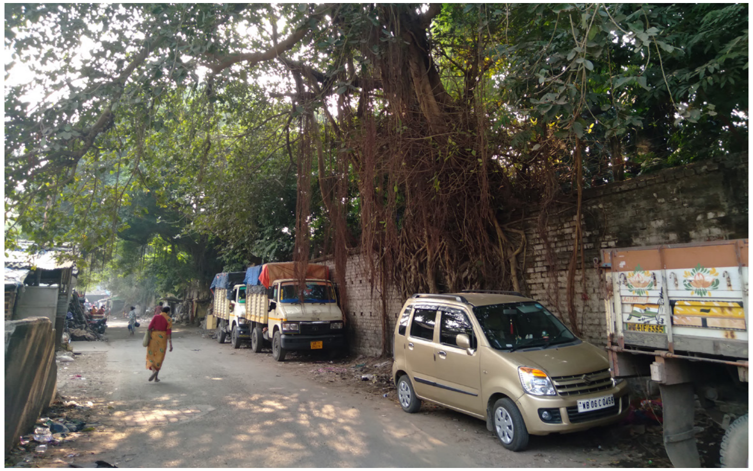
Bottom Centre and Right: Encroachments and traffic on the east gate and edge of the Botanic Garden.

The east boundary wall of the Botanic Garden is lined with hutments and is also used for parking of buses. Engagement with the government would be needed to help solve these problems.









Left: The housing used by the gardeners and workers of the Botanic Garden on the north side.

Right: Unofficial entrance to the housing from Andul Road.

Bottom: Large portion of land encroached by a local community on the Nazirganj side.

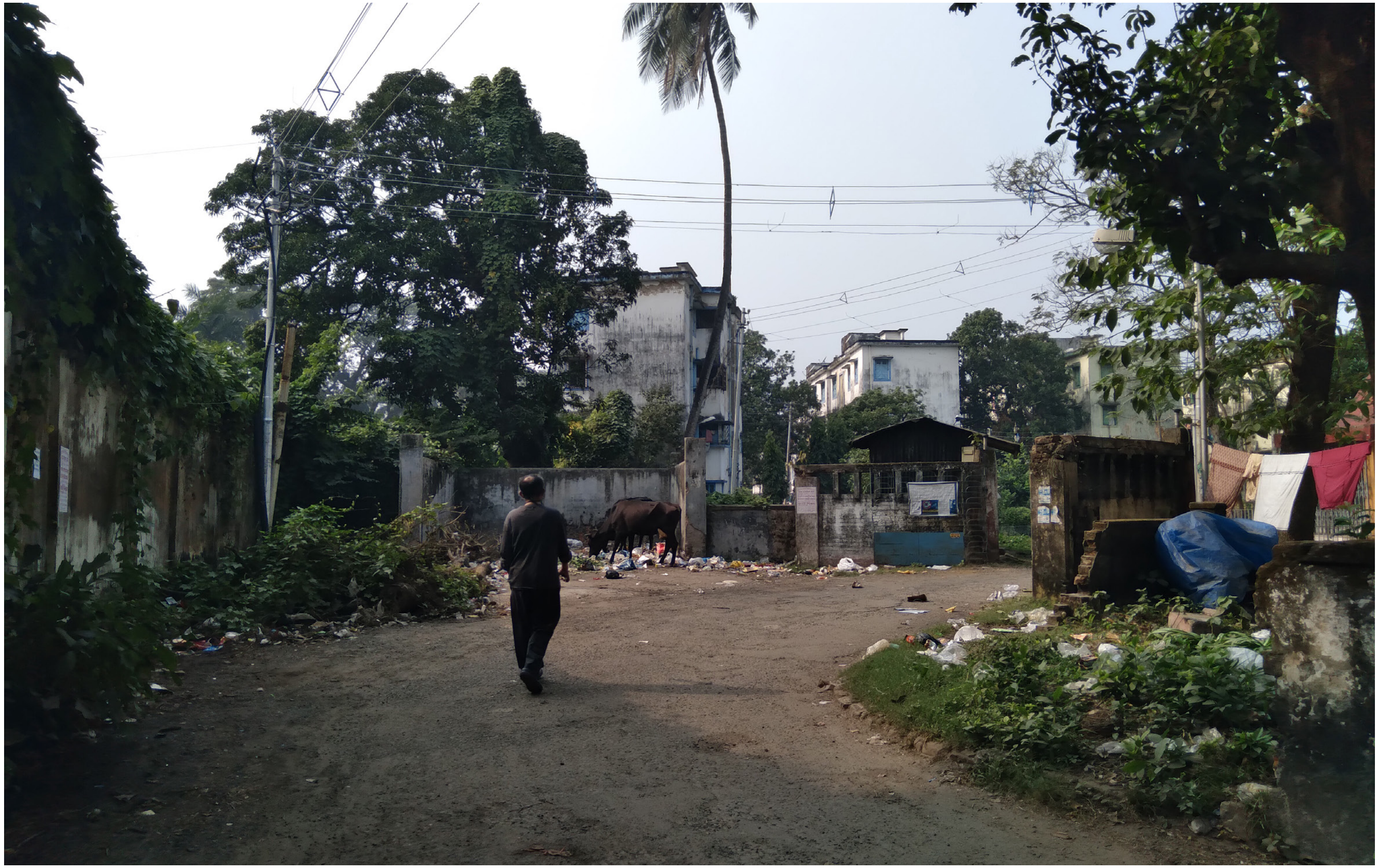
The north and west boundaries of the Botanic Garden have problems of permanent encroachment. The north east side has an old settlement, as old as the the Botanic garden where the workers stay. But an illegal gate there gives access to many unwanted and illegal activities that pose security threat to the campus. Several places in the west boundary have been encroached by religious buildings and their ancillary structures. A full fledged community based initiative will have to be started to negotiate with the residents for an amicable solution.

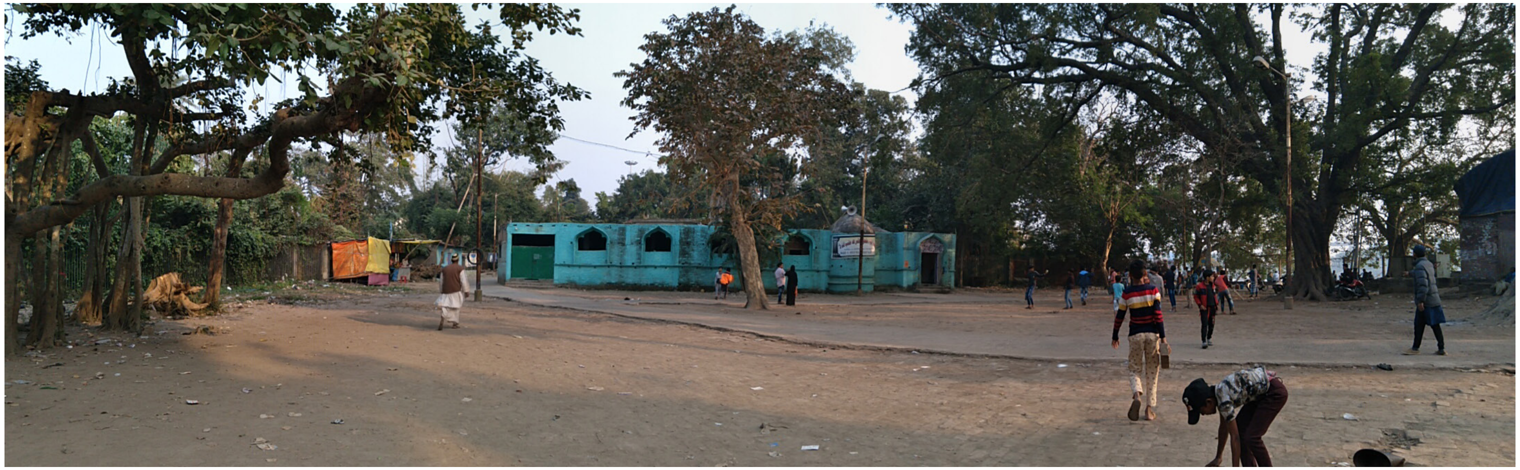
SOFTWARE WIZARD
BEAUTICIAN COURSE
HARDWARE & NETWORKING
এখানে পেচ্ছাব
করিবেন না

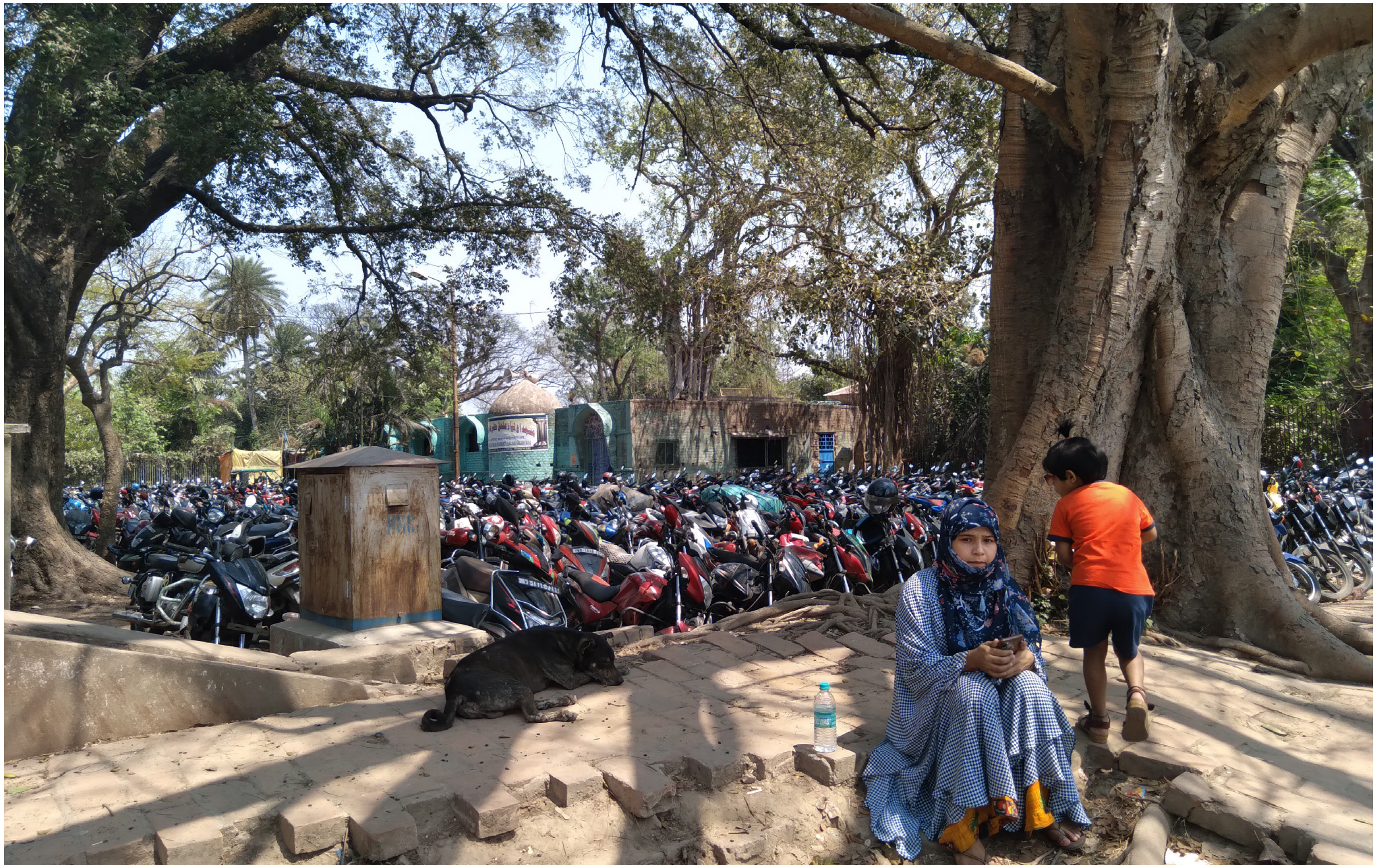
A dense housing project abuts the north side but no resident gets to engage with the green environs of the Botanic garden. The gardens thus form a back to the housing, and is then used for dumping solid and other waste that soon finds its way into the soil of the garden and the lakes, causing pollution and damage to the biodiversity. A program for mutual understanding and appreciation between the stakeholders will help solve this problem.

Left: Non-operational gates near the IIEST college and the Banyan tree.

Right: A large government housing project abuts the north side edge of the Botanic Garden.







Far Left Top: River side edge on the Nazirganj Ghat.

Far Left Bottom: Illegal activities and encroachment on the western ghat.

Left: The eroded water edge of the Botanic Garden.

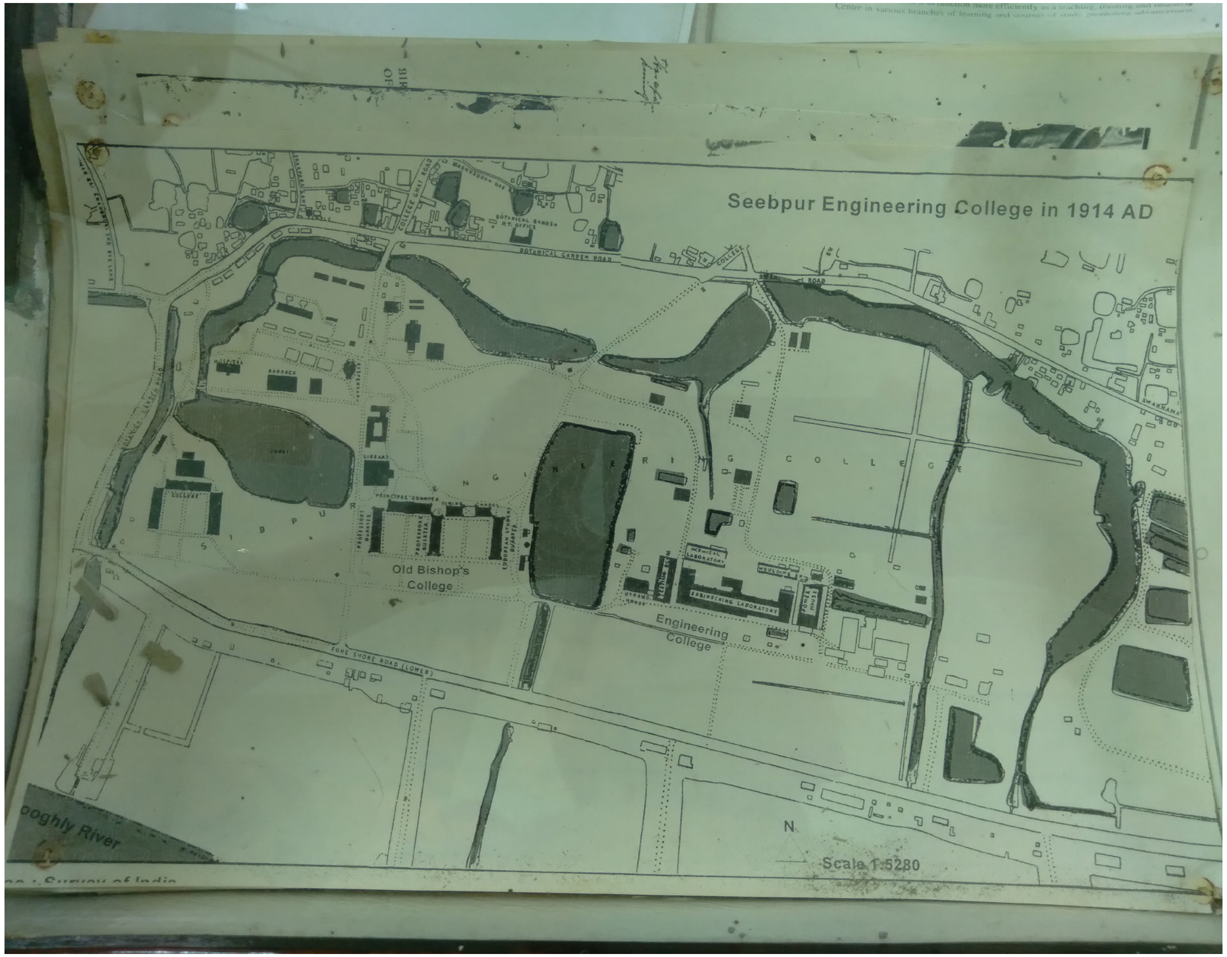
Right Top and Bottom: Land encroached on the west of Botanic Garden and used as a two wheeler parking for traders using the jetty to cross the river.

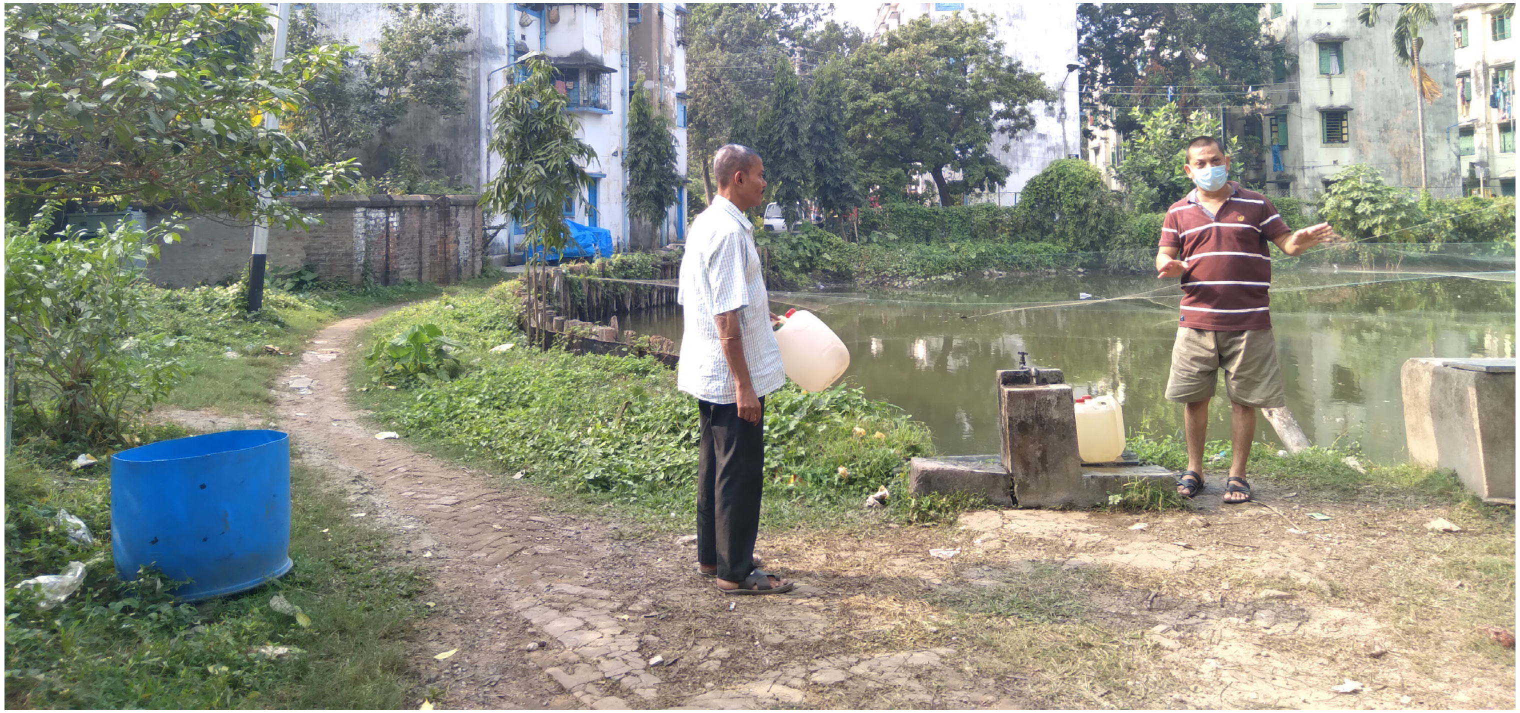
Top Left: Cultural activities on the east ghat.

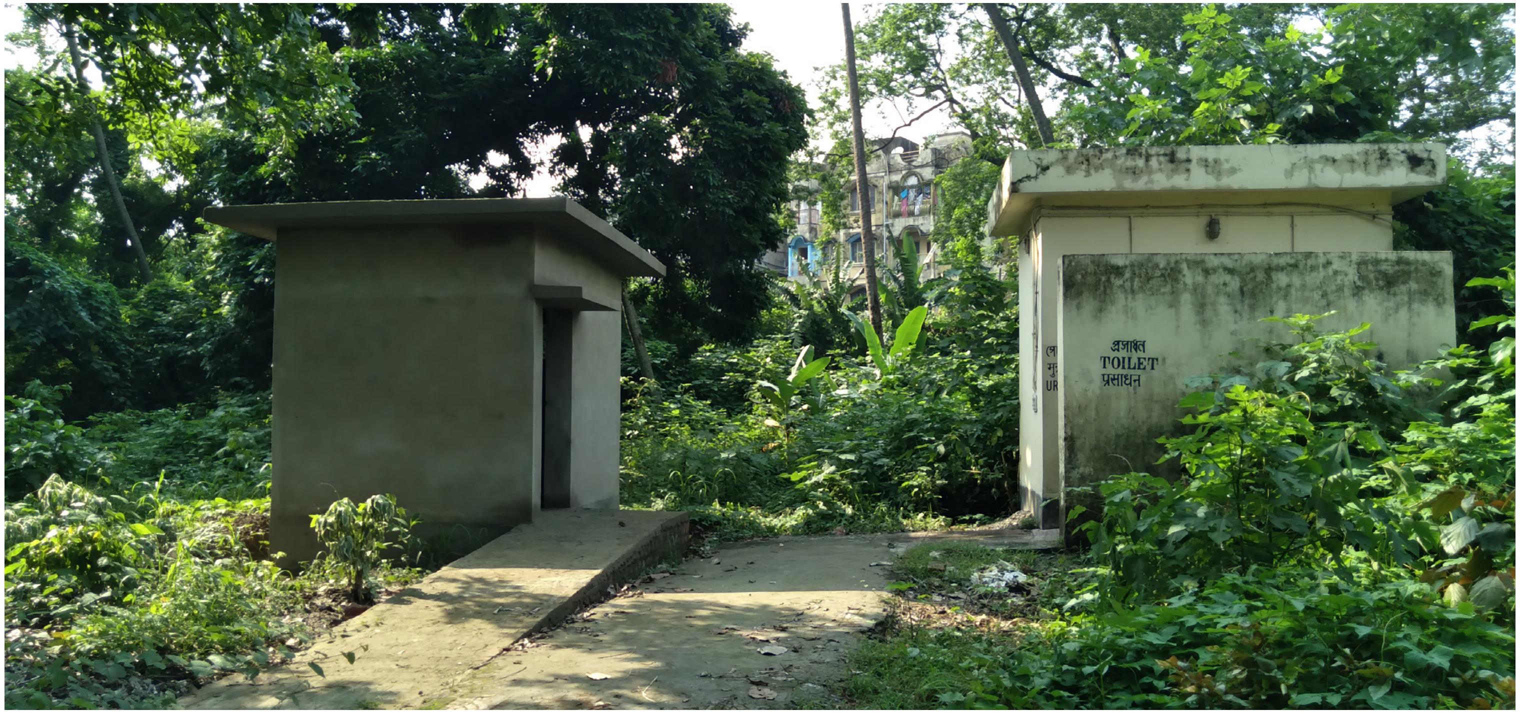
Left Bottom & Right: Views of the Botanic Garden from the east ghat.

Water System

The Botanic garden is fed by a canal on the west and north boundaries through two sluice gates. This brings and manages the tide water from the river. This in turn feeds the 24 lakes which are interconnected. This canal is currently fed with sewage waste from the neighbouring housing, and then into the lakes. It is important to identify the breeches and plug the same. An old drawing of the neighbouring engineering college shows a similar water system. As per local knowledge, high tides bring in sweet potable water during the high tide and disposes the waste water during the low tide. A detailed study needs to be made of the traditional water system that existed in the garden area. Interestingly, a water supply pump is installed within the campus, which supplies water to two purification plants in Howrah. That water is not used by the Botanic Garden, which uses its own bore pumps for extracting water.





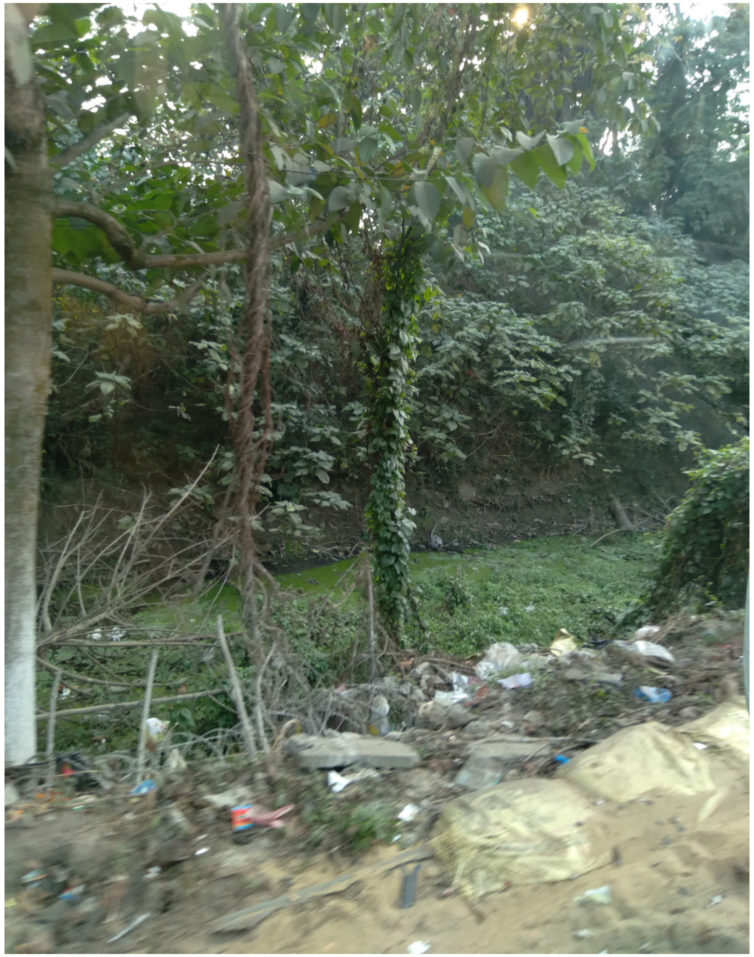


Far Left: 19th century water pump system in the IIEST campus.

Left: An old map of the IIEST sharing a canal similar to the Botanic Garden. (Source IIEST Library)

Right Top: Small lakes dot the area around the Botanic Garden used for drinking water.

Right Bottom: The canal between the north boundary and the toilets in the Botanic Garden.



Top Left: Sluice Gate in the East edge of the Garden.

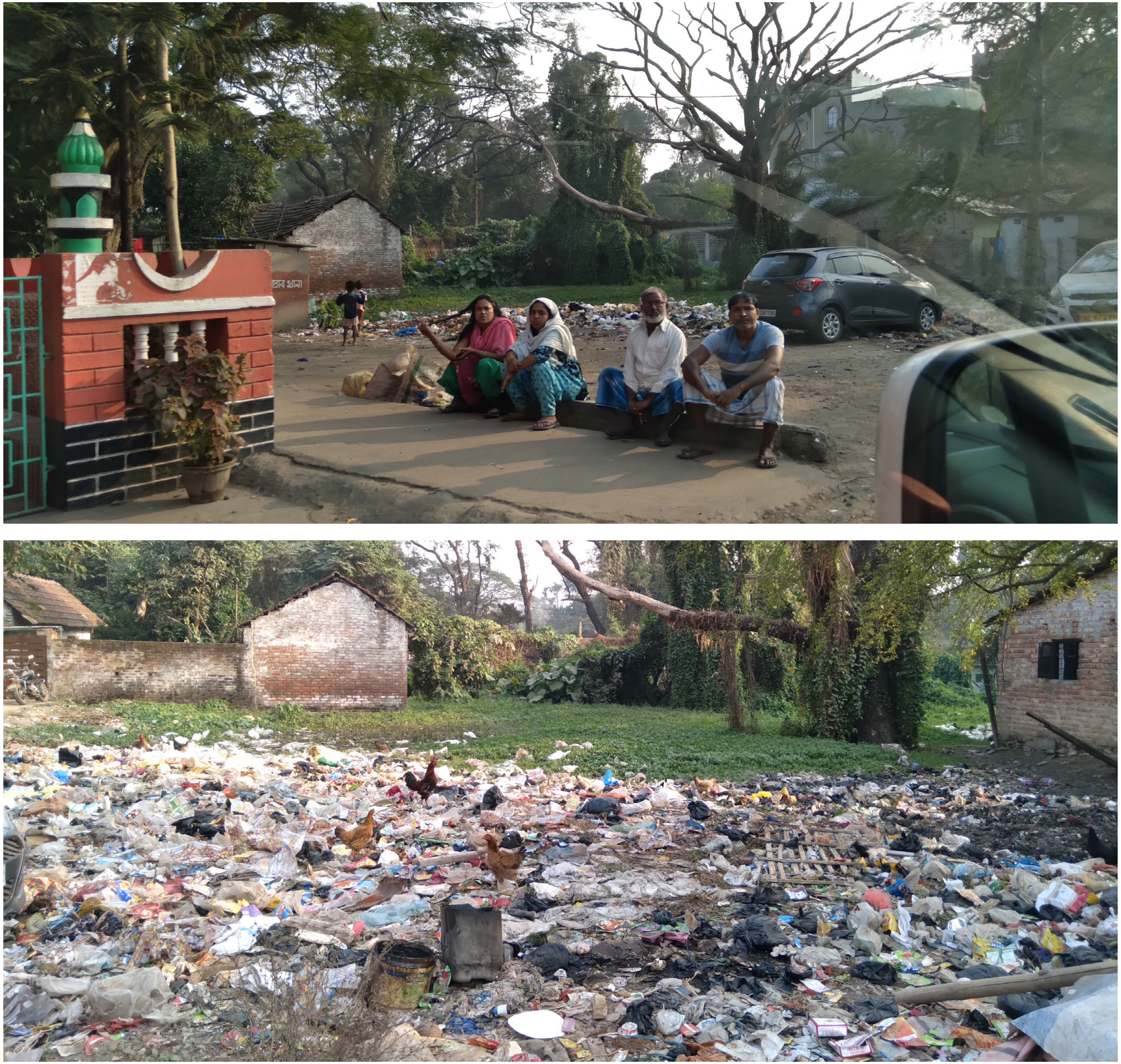
Top Right: Second Sluice Gate on that West edge of the Garden Part of the canal is outside the garden premisses today.

Left Bottom: The canal as it flows from the west to north along the boundary.

Right Bottom: Canal flowing through workers quarter.

Right Top: Canal flowing outside the west boundary wall.

Extreme Right: Canal flowing through Andul gate.



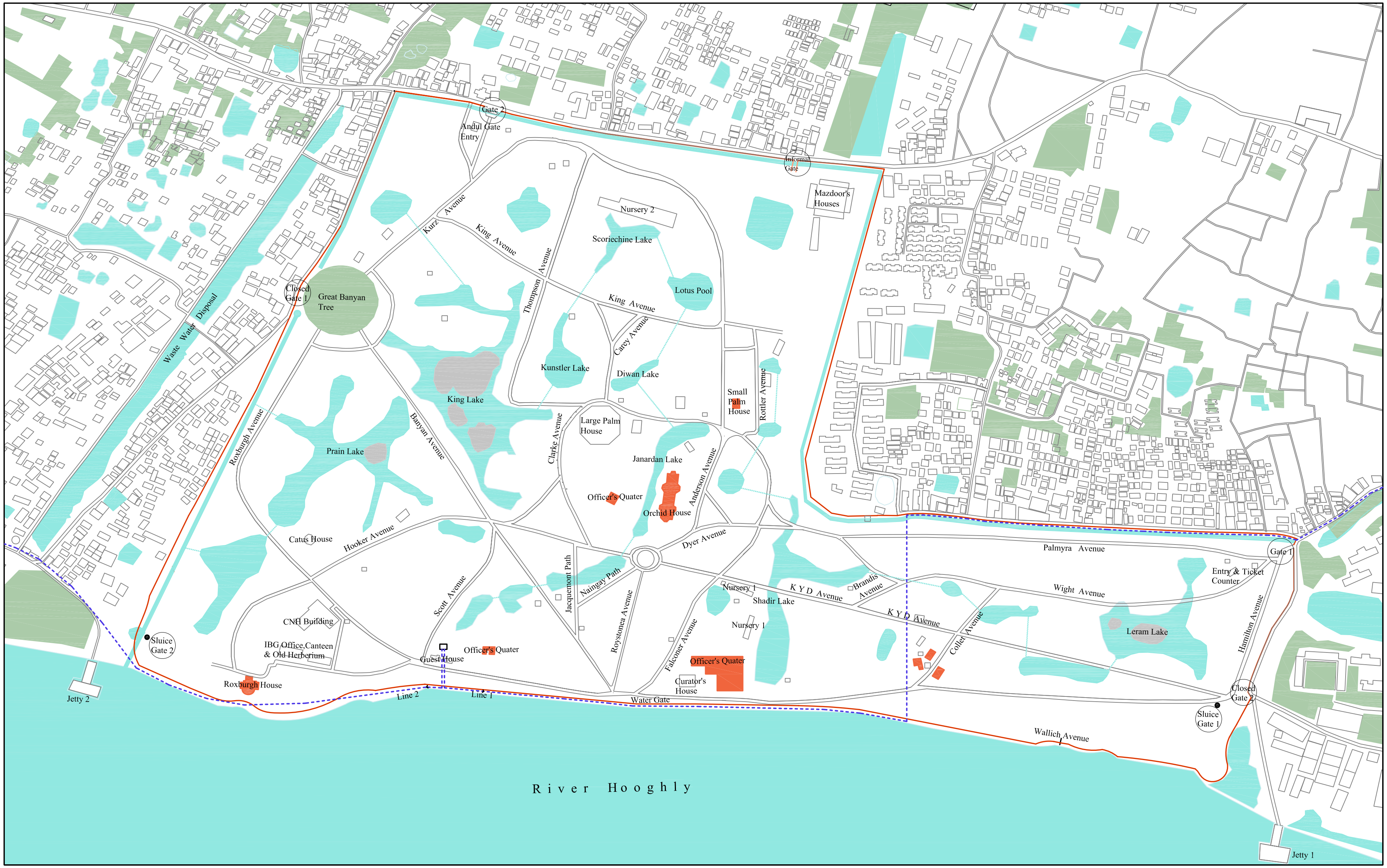
Left and Right: The canal is breeched on the west side and collects garbage from the housing in the Neighbour hoods.

Left: The Howrah Municipal Corporation water pump on the water edge of the Botanical Garden.

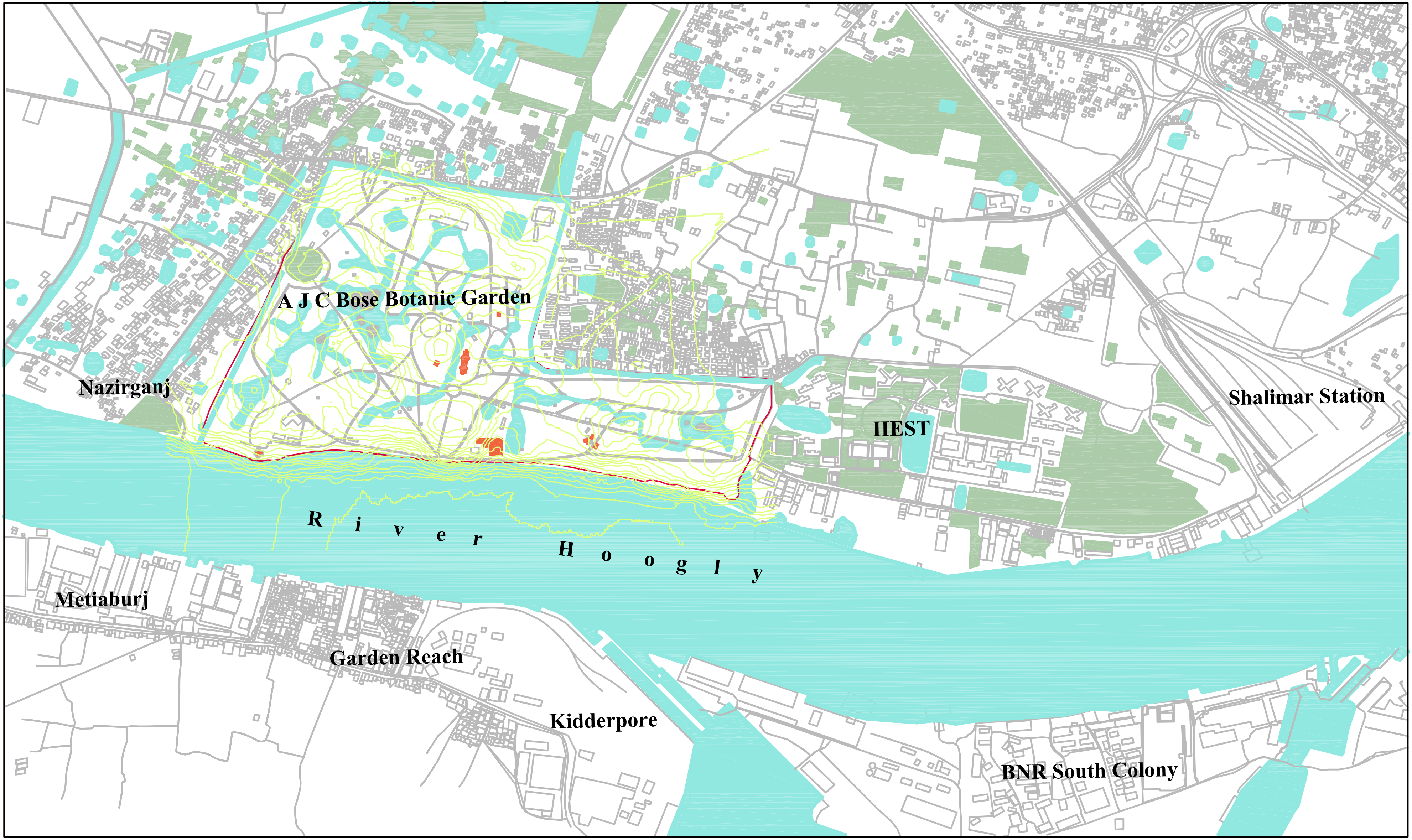
Top Left: An inspection valve of the water supply.

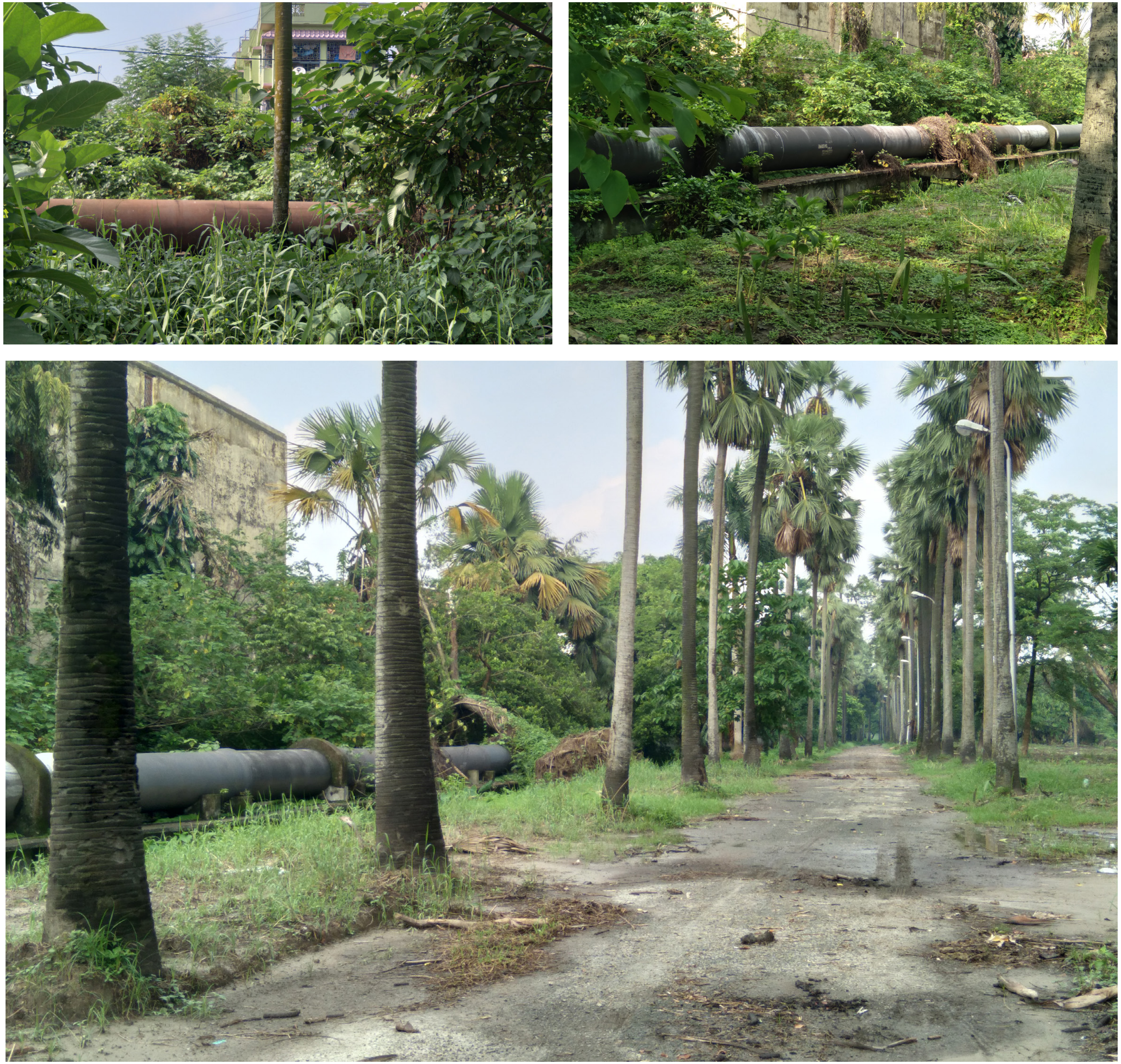
Top Right and Bottom: The water supply pipe line which moves along the river below the jetty which protects it from vandalism.

Revised Site Map of the Botanic Garden (Source: Neeta Shubhrajit Das Associates).

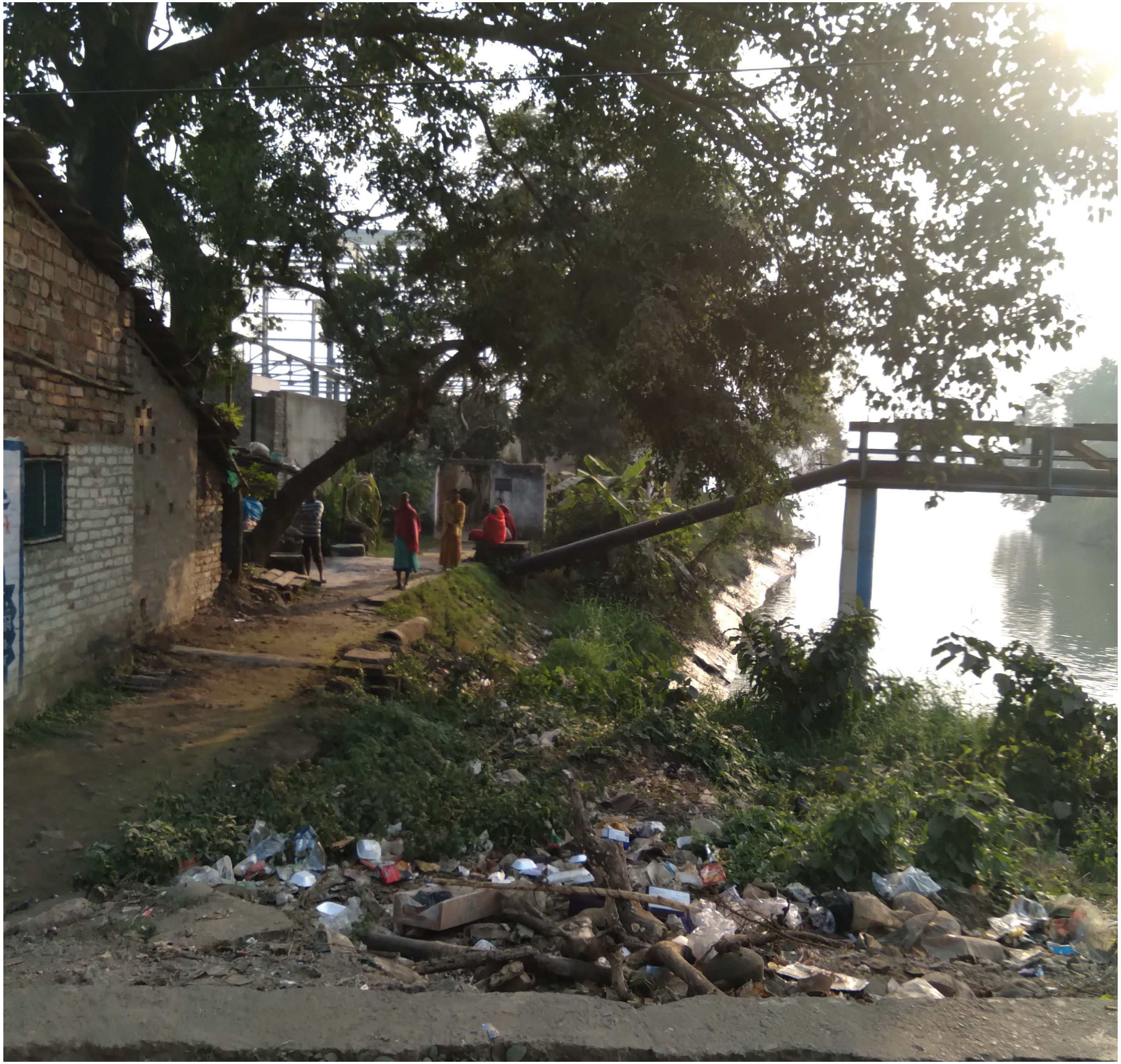


Revised GIS area Map of Howrah (Source: Neeta Shubhrajit Das Associates).





Left: The water supply pipe as it moves on the north boundary.



Water supply line on the Nazirganj side (West of the Botanic Garden)

Funding Prospects

Ar Jane Burridge

A component of the **UoEPF Community Participation Scoping Project** was to explore the potential funded pathways and stakeholder possibilities which could be developed going forward to support the wider ambition and vision for a **Regeneration and Ecological Framework Plan(REFP)** for the Acharya Jagadish Chandra Bose Indian Botanic Garden.

The REFP was conceived to ensure that the exceptional horticultural, scientific, heritage and cultural collection of the AJC Bose Indian Botanic Garden would be protected for future generations, acknowledging both its international importance and the critical need for restoration which currently exists following the recent impacts of Cyclone Amphan and COVID 19.

The vision proposed by the Regeneration and Ecological Framework Plan presents a persuasive 'Case for Support'to potential funders and partners, to endorse a project that responds directly to key global concerns of the 21st century including the environment and climate change, the need for international co-operation in the related sciences, the conservation of plant and living species, the preservation of green space, sustainable communities, and poverty alleviation.The Regeneration and Ecological Framework Plan seeks to revitalise the full garden: not only the ecology of plants and collections but also the ecology and well-being of people and communities.

It is envisaged that the REFP and its constituent parts will involve many stakeholders and complex components establishing important relationships between the UK and India, ranging between Indian National and Regional Government and both the UK and Scottish Government, UK and Indian Academic Partners, UK and Indian Charitable Trusts (e.g. the Asia Scotland Trust [AST], Kolkata Scottish Heritage Trust [KSHT], UK and Indian Institutes (e.g. Edinburgh Botanical Gardens and the Botanical Survey of India, Kolkata; British High Commission in India and Historic Environment Scotland), Local Communities in Kolkata/Howrah and both Indian and UK/global Corporate Organisations.

The **University of Edinburgh Partnership Fund (UoEPF)** is an academic fund which supports international collaborative work on targeted projects, and it was designed to allow relationships with a diverse range of partners (including universities, charities, local NGOs, government organisations and industry) to develop and strengthen through collaborative endeavours, whilst the impact of COVID 19 currently restricts international travel and research. The funding was provided by the Scottish Funding Council as part of the Global Challenges Research Fund (GCRF) – a £1.5 billion fund to support cutting edge research that promotes the economic development and well-being of those in LMICs. The GCRF is a key component of the UK's overseas aid strategy, and it forms part of the UK's Official Development Assistance (ODA) commitment.

The **UoEPF Community Participation Scoping Project (CPSP)**was seen as one of a series of steppingstones leading to a larger project vision and economic recovery of an Internationally significant area of India. The UoEPF feeds into and informs what the bigger vision of the Regeneration and Ecological Framework Plan (REFP) might encompass. It was intended that the local, regional, National, and international dynamic of the CPSP would provide a platform from which future different aspects of the REFP could evolve.

Central to the UoEPF CPSP was the establishment of the core working team of Project Partnersand through their collaboration with the BSI the study sought to identify the 'Communities' both within the gardens and the wider adjacent urban environment and investigate their 'participation' and connection to the garden. This first scoping study was deemed an important focus of research not only for understanding the context of the Garden and determining priorities and potential projects, but for the engagement of future partners and funders. Such early-stage studies are the foundation on which bigger projects are built, crucially documenting the evidence to support the need for further funded work and often advancing ideas concerning overall project ambitions.

From the outset it was envisaged that there would be many strands to the Regeneration and Ecological Framework Plan which would be realised over an extended period of years. The UoEPF CPSP findings provides a comprehensive introduction to these different aspects of the Gardens, and the project final report offers an extensive summary of the range and scale of some of the elements encompassed.There are indeed many parts of the project which will constitute further individual study and standalone project(s) - many of which will involve timescales of several years and significant cost. The connection between these different projects will also be fundamental to the overall regeneration of the complete garden and indeed will be important to funders of individual projects to have the wider link to the bigger vision and complete stakeholder group. Both the overall vision and the incremental development of the individual projects will therefore be significant to all parties. As the regeneration of the garden evolves over time and the predicted outcomes are more clearly defined and indeed measured - further funding + support should follow.

It was envisaged that the output of the CPSP would form the foundation of a much larger UK Government funding bid for the Darwin Initiative or similar ODA approved. Also,other funds which support further scoping work and/or research collaboration would be considered whilst the CPSP was ongoing.

Darwin Initiative Main Fund

The Darwin Initiative is a UK government grants scheme that helps to protect biodiversity and the natural environment through locally based projects worldwide. The Asia Scotland Trust had identified at an early stage a good synergy between the ambitions for revitalising the Gardens in Kolkata and the key drivers of the Darwin Initiative. The UoEPF Community Participation Scoping Project was developed with a view to(among other things) informing a future Darwin Initiative application in connection with the AJC Bose Indian Botanic Gardens, Kolkata.

Darwin funded projects usually aim to help preserve biodiversity and the local community that lives alongside it. The early findings of the CPSP scoping project present these twin elements of biodiversity and community as potentially central to the future

The lakes are rich bio-diversity hot spots in the Botanic Garden.

of the Botanical Gardens in Howrah. Whilst the possibility to develop and lead a Darwin Project therefore clearly exists the project partners believe that more development work is needed first to fully understand the context and frame a long-term vision for the gardens. That in turn would enrich a possible future application to the Darwin Initiative at a later stage.

The UoEPF CPSP study and its findings have advanced ideas for a possible future Darwin Initiative Fund application in the following ways;

1. A good working relationship was established between the BSI and the CPSP project partners and informal discussions have occurred between these parties and RBGE/DI.
2. A first complete overview of the scope and wide diversity of issues effecting the Botanical Gardens in Howrah has been prepared
3. A key area of focus on the garden (+ community) water systems and conservation of certain species has been identified for further investigation
4. The Botanical Gardens Conservation International have been approached to bring the Kolkata gardens (and the network of gardens that they are part of) into their organisation. Achieving various BGCI Accreditation standards would be something that would be built into a main Darwin Initiative project.

In a future phase of the CPSP or other next stage scoping study(working closely with the BSI) a DI proposal could be suitably defined;

1. Further development of the concept of the proposed main project and its key areas of focus
2. Further understanding of how that might sit within the wider context and an overall vision for the garden as a potential 'biodiversity resource'
3. Establishing the relevant project partners and lead
4. Developing a strategy for match funding provision

Darwin Initiative Partnership Fund

A Darwin Initiative Partnership Fund project often precedes a DI Main project as the purpose of the DI Partnership Fund is to hear from partners overseas and to build a relationship the funding available generally covers the international travel element to facilitate this. A partnership application also needs to have clearly defined what the specific focus of a DI Main Fund Application will be.

Whilst not progressed previously due to restrictions on International travel this fund might serve as a clear introduction to a Main Fund application in the future.

Dr. A.A. Mao, Director, BSI, explaining interns, the terchniques of biological art of the 19th century.

RSE Bilateral program

The International Bilateral Visits Programme facilitates the collaboration between researchers from Scotland and those based in Institutions with which the Royal Society of Edinburgh has a formal Memorandum of Understanding. It was envisaged that this fund could provide support to a delegation from the BSI to visit RBGE/Kew Gardens. An application to the December 2020 funding round was not progressed as the BSI visit to RBGE was postponed due to the COVID pandemic. The fund is currently closed for applications.

With a view to taking forward the project beyond the UoEPF CPSP and further developing an overall vision for the Regeneration and Ecological Framework Plan many parties were approached and/or consulted as potential future stakeholders during the UoEPF CPSP including the following;

Royal Botanic Garden Edinburgh
Botanical Gardens Conservation International
Centre for World Environmental History (CWEH), University of Sussex
Scottish Government • International Division
Historic Environment Scotland • International Partnerships
Scottish Environment Protection Agency
Dundee Heritage Trust
National Gallery of Scotland
WaTeREd (Water Technology and Research at Edinburgh) Network
Scottish Government • Hydro Nation International Centre + The James Hutton Institute
Clean Water Wave CIC
International Corporate Support
Charitable Trust Support

The AST have received written endorsement for the project from the British High Commission, New Delhi. AST's Trustee Sir Rob Young was British High Commissioner to India from 1999 to 2003.

The AST also investigated developing a project concerning the Collections of the AJC Bose Indian Botanic Garden and related International research funding.

Arts and Humanities Research Council (AHRC)

The AHRC promotes international links at many levels: from policy through to research funding and researcher links.The AHRC encourages international engagement as an integrated part of its standard funding schemes and operates several partnerships with international research funders.There are a number of international funds including the EU-India Platform for Social Sciences and Humanities (EqUIP).

Towards a National Collection : Opening UK Heritage to the World

The AHRC on behalf of UK Research and Innovation (UKRI) is leading this project.Towards a National Collection is a £19m research investment in collaboration with the UK's world leading cultural and heritage sector. Funded from UKRI's Strategic Priorities Fund the programme addresses the lack of coordination between different online collections and catalogues, which constitutes a major barrier to research and public access. The aim of Towards a National Collection is to harness digital technology to begin to dissolve barriers between different collections, in order to enable new cross - disciplinary and cross-collection lines of research, and to open them up to new audiences in new ways. The programme will extend across the UK, will involve collections and institutions of different scales, and will potentially have a global reach in terms of setting a standard for other countries building their own collections (with the long-term potential for inter-connection between national collections)

Global Heritage Fund

The Global Heritage Fund is a not-for-profit organisation committed to protecting endangered cultural heritage sites and traditions. The work of GHF includes being involved in many World Heritage sites.

Many of the focuses and issues relevant to the AJC Bose Botanical Gardens were the subject of international discussion whilst the UoEPF CPSP progressed providing insight and further references to the project.

Conferences and related research papers

BGCI/Kew international conference on Reafforestation (24-26/02/2021) highlighted the BGCI's work supporting international communities.
The Miscellaneous Reports Collection, Kew Gardens (02-04.03.2021) including the paper on the Botanical Gardens in Kolkata by Marine Bellégo, Université de Paris
The Gardens Trust Seminar - Working Toward Inclusive Botanic Gardens (24.05.2021)
Kew Gardens' Manifesto for Change
Calcutta Botanic Garden 1833 - 1914 (Kings College London thesis)

Conclusion & Way forward

Dr. Dorian Wiszniewski

Towards a Regeneration and Ecological Framework Plan – Kolkata as a "Garden" City

My colleague in India, Professor Indra Munshi, has a forthcoming book on Geddes in India. I commend it to the readership of this report. It will be an important reference document for anyone concerned with the study of "civics," particularly the Civics of India. Civics, for Geddes, concerned the life and working of the city.Although the CPSP focusses on the environs of the AJC Bose Botanical Gardens, it operates also as a concern for the life and workings of Kolkata and Howrah. It operates from the sensibility derived from a study of Civics and, as such, is seen as a contribution to the city survey necessary in the first instance to the establishment of a REFP for the gardens. This report is mindful of Geddes but also the actuality in which the AJC Bose Botanical Gardens operates. An important aspect of the study of Civics, the study which prioritises the life and working of the city, then, is to see it as an order beneath which urban planning, architecture and all economic, legal and administrative matters operate. Therefore, although this report has only an academic status it is hopeful that it has uncovered pertinent points for the future development of the AJC Bose Botanical Gardens but also how the gardens might influence a possible conception of Kolkata.

As Munshi tells us, Geddes had been involved in designing Zoological and Botanical gardens. Geddes thought that a great deal could be achieved if town planners, architects and gardeners came together. We hope the community of stakeholders is greater than this. However, Geddes' point is understood. Geddes was happy to describe himself as a gardener! In the same vein, the CPSP encourages all community stakeholders to become gardeners of sorts. Thus, also, the CPSP promotes the idea of the AJC Botanical Garden as a garden that encourages Kolkata and Howrah to be seen as a city of gardens, a different form of garden city.

Two lists are tabled. Table 1 describes 12 pertinent issues that Geddes, via Munshi, helps the CPSP frame, particularly concerning water bodies and green spaces of the city. Table 2 is a series of questions that begins the process of thinking the AJC Bose Botanical Gardens as belonging to a conception of Kolkata as a Garden City and, therefore, some of the roles it may wish to take up in reconsidering its own structures as an institution within the city. It is not imagined that all of these questions are considered immediately agreeable. However, the two tables act together to record some of the discourse prompted by the findings of the CPSP, as contributions to the stakeholders as they move forward to consider the next stages of the development of the REFP and as possible issues to be taken forward by any follow-up research projects.

Table 1

1. Besides considerations of housing, sanitation and adequate infrastructural facilities, Geddes' idea of a city incorporatedopen green spaces, parks, gardens, trees, and water bodies. The AJC Bose Botanical Gardens is one of these spaces and needs to be seen in series with others. Kolkata could be seen as a unique type of "Garden" city.
2. In Indian cities, Geddes recognised the state of the existing water tanks, big and small, gardens, parks, rivers, ponds, and trees in general. He commented extensively on their existing state, and ways to improve them. He found that good traditional practices ensured better natural conditions, while in others he noticed alarming neglect. Neglect is the first aspect this CPSP wishes to address. However, it simultaneously promotes proper training and skilled maintenance of natural resources and the environs they allow to flourish. Cleaning, improvement and beautification of all water bodies, as it historically has been, is an everyday rhythm and pattern which contributes to the cultural as well as biological life of the city. Well maintained gardens are beneficial to locals but also attractive to tourists.
3. Geddes was an early proponent of the benefits of biodiversity, recognising, for example, that fish and birds effectively keep down mosquitoes, and help to keep water bodies clean. Water movement is essential to a healthy co-existence between plants and people.
4. Geddes suggested community projects where local children could actively participate in garden maintenance. Community participation changes potential resource to actual amenity.
5. Geddes recognised the value of nullahs. However, again they need proper maintenance but also appropriate dimensioning, associated planting and nurturing. He saw nullahs as potential public parks and means of poverty alleviation by creating opportunity for local food productionnot just unsightly and foul drains. This is backed up by the work of Dhrubajyoti Ghosh. Water parks for Geddes, were sources of re-creation in the fullest biological as well as amenity senses. The diversion of domestic

and other organic waste matter to water vegetables and fruit trees and feed fish are already well-recognised and well-tested ecological practices.

6. A small garden, a series of small gardens, is no less valuable than a large garden. Large gardens can be seen as series of smaller gardens. Smaller gardens can appeal to smaller communities, larger gardens can appeal to larger communities. There is scope for the AJC Bose Botanical Gardens to offer its perimeter as a series of smaller community gardens that act as part of the larger garden but maintained by locals who can reap the benefits of the amenity directly. These gardens can operate with other building programmes, like small temples, to contribute to a greater sens of civic participation and cooperation.

7. Geddes was an early advocate of the benefits of the local, regional biosphere. He saw the importance of trees and planting appropriate to the place and requirements. He noticed that certain trees protect from the wind whereas others facilitate a breeze through their less dense foliage. He was particularly critical of growing plants that compromised amenity for looks. Landscape-making is also city-making. Landscape well-being is city well-being.

8. Geddes was wary of overly regulated gardens. “Beautification” risks exclusivity. Geddes disliked the proliferation of signage that reminded citizens of prohibitions rather than opening spaces for rest, production, amenity and play.

9. Geddes promoted architecture as a means of framing amenity, particularly preferring the maintenance and upgrading of existing structures where possible.

10. For Geddes, gardens were means of promoting citizenship and public participation in maintaining the city. Gardens are the means by which new and existing homes and workplaces are enriched socially and biologically.

11. Geddes could be argued as an early pioneer of Landscape Urbanism. He recognised that lack of finances was not always the reason for either absence or failure of good programmes. It is not always necessary for buildings to be the basis and expression of social and cultural well-being. Gardens can be an economically wise way of spending limited resource for significant shared gain. Furthermore, he considered gardens as a means for generating public spirit and attracting greater financial contribution from the full economic range of citizens.

12. For Geddes, renewal of gardens was effectively a renewal of the city.

A section of the boundary wall overgrown with ficus roots.

Table 2

1. How can the AJC Bose Botanical Gardens develop their own

specificity, that is, how do they take on a role in their international, national and regional context, and how do they make use of and develop their specific resource of expertise, but also in response to local, national and international concerns on climate change and ecology, e.g. how might wetlands be considered within the interests of the AJC BoseBotanical Garden and how do they relate to their broader Sunderban and Kolkata East wetlands context? How can the "gardens" compliment Dhrubajyoti Ghosh's work on the East wetlands to extend the ecological "subsidy" to Kolkata. His system of water channels (as developed in the first instance by a Bengali engineer trained in Glasgow) that transfer waste water to wetlands may provide guidance to in-garden and perimeter projects.

2. Can the gardens act as a fulcrum for climate change discourse at local, national and international levels? Can the gardens be the epicentre of a new ecological vision that resonates at local, national and international scales?

3. Can the existing resources and buildings on the site be repurposed and complimented within an updated vision for the gardens? There are many speculations to building use, but how do they cooperate towards a shared ecological vision?

4. Can the scientific and public amenity bases promote and develop the gardens as a biodiversity resource at the local scale? Can this contribute to the discourse and affectivity of biodiversity at national and international scales?

5. Rather than see the gardens merely as a (faded) representation of power, can the Gardens empower community as an aspect of a regenerated sense of civic institution? Can the Gardens allow a range of stakeholders to become involved, not only to develop, and share and proliferate the vision as a biodiversity resource but also in its own management structures as it moves forward?

6. Can the gardens accommodate community-based biodiversity projects and associated longer-term programmes?

7. How to develop the water systems of the gardens, as a heritage project (their hydro-engineering is concomitant to the early Kidderpore Docks) but also how they might be considered part of the biodiversity resource and the hydro-ecology of Howrah and Kolkata?

8. How to rethink the gardens as an urban condition and rethink the edges? For example, can there be greater perforation and flow between the gardens and local communities, can they link to a bigger city scale network of biodiversity resources and can they be more successfully linked into a water transport system?

9. How to offer something other than promoting the content of botanical gardens as theme parks of the "exotic"?

10. How to establish a productive relationship that respects and promotes differences between the AJC Bose Botanical Gardens and the community of world-wide botanical gardens, including those more historically directly connected, e.g. Royal Botanic Gardens, Edinburgh, and Kew Gardens, London?

Urban Planning in Calcutta/Kolkata has had a slow and interrupted development. The contemporary plan, Vision 2025, Perspective Plan of CMA, prepared by Kolkata Metropolitan Development Authority, appears not to be very influential and is only the second version prepared since Indian Independence, the first was in the 1970s. There are virtues in this: for example, there are many sites of important heritage status, although dilapidated, but as yet unaffected by major urban redevelopment. However,

A view of the Botanic Garden from the east Ferry Ghat.

there are also major problems: for example, the social, technical and ecological infrastructures are underdeveloped, there are also many sites that may be called 'green' or with ponds/tanks not fully considered as belonging to a network of green/wet spaces, and the city is now vulnerable under new contemporary national and regional politico-economic pressure to develop quickly.

The CPSP is seen as one of a series of stepping stones leading to a larger project vision and economic recovery of an Internationally significant area of India. The CPSP feeds into a bigger vision for a Regeneration and Ecological Framework Plan for the Acharya Jagadish Chandra Bose Indian Botanic Garden, Kolkata. More than 20 per cent of the world's plant species are at risk from extinction. All known life depends on plants, and plants can provide the solutions to so many of the world's challenges. The CPSP has been carried out in parallel with other academic work and there has been a cross-fertilisation. Emanuele Coccia's book, The Life of Plants, A Metaphysics of Mixture(Cambridge: Polity Press, 2019), has been particularly influential in my work throughout these parallel studies. Plants, as the very creators of atmosphere, occupy a very fundamental position from which we might rethink civic arrangements. The AJC Bose Botanical Gardens is one of the earliest botanical gardens in the world, an early pioneer in developing the life of plants and our life with plants. Originally founded by a Scot in 1786, it has maintained strong ties with Scotland throughout its history. In recent years the garden has fallen into neglect, has been hit by COVID and also by the disastrous cyclone Amphlan in March 2020, which brought down hundreds of magnificent trees, adding additional urgency to its need for regeneration.

A vision to restore it is now needed to ensure that this exceptional horticultural, scientific and environmental heritage and cultural collection is protected for future generations. This is an amenity that has the potential to contribute to the well-being of all occupants of the cities of Howrah and Kolkata, many in the greater region of West Bengal and those who live in or visit India. Such a development could safeguard the garden's public amenity, and the globally important collection of plants and records. The outcomes of a REFP could enhance research facilities, public amenity and address weaknesses in the ageing infrastructure not only of the AJC Bose Botanical Gardens but also across the urban and regional context. The REFP could also pave the way for the creation of important new green jobs, apprenticeships, training and investment in the education, tourist and construction sectors, all of which is of greater importance in the post-COVID-19. The project could work towards a green recovery and develop Kolkata and India's reputation for strong leadership in tackling climate change and biodiversity loss. The project could contribute to local, metropolitan, regional and national welfare and economic development, with green credentials at the core of all activities.

There is heightened awareness of ecological relationships and interdependencies, particularly of human and environmental health and the interdependence of social justice and sustainable development. A Regeneration and Ecological Framework Plan could advance a compelling impetus for the Governments of West Bengal and India to adopt positive change for the benefit of humanity and the planet. The REFP could be promoted as a local and global resource within an international framework. It could address relations between communities, biodiversity loss and associated issues of climate change. The work could reflect collaboration across international governments and organisations. It could address the need for transformative change in how people co-exist with nature. Benefits could operate between economic and ecological impetus, where the interdependent well-being of people, animals and plants will be secured.

United Nations Sustainable Development Goals.
All 17 UN Sustainable Development Goals are pertinent to the project. The CPSP has touched on the following goals (those emboldened are considered priority):
1 End Poverty for All: There are opportunities to involve perimeter communities in some aspects of the gardens, perhaps even to allow for community gardens within the precinct of the gardens.
2 Freedom from Hunger: although hunger is not strictly an issue for all communities, the possibility of community gardens could supplement the provision of food in the poorer communities around the gardens.
3 Health and Well Being: The gardens as a public amenity could definitely assist in the well-being of a broad range of stakeholders
4 Quality Education: we suggest the adaptive re-use of buildings as education centres and gardens as a biodiversity learning resource
5. Gender Equality: a look at the Human Resources programme of the BSI might flag opportunities to address these issues, but also in all stages of further research and project framing.The REFP could be key in addressing any latent gender issues within decision making processes, particularly in the Indian context. It is essential that the next stages of the project keep developing community participation methods. The REFP could be useful for bridging any detachment and gender issues between municipal authorities and local communities, and dealing with gender and caste inequities.

The REFP could develop the necessary methods for dealing with any sensitivities still in operation between distinct male and female systems of community participation.
6 Clean Water and Sanitation: there are a range of interconnected and independent water bodies in the gardens and a perimeter drainage ditch all contaminated by effluence from local perimeter housing; there may be a possibility of using the water bodies and ditch as natural ecological filtration systems
7 Sustainable Energy for All: the area is frequently hit by cyclones and the longest edge of the gardens is tidal; as it stands there is no wind or wave energy system in place, but the site could lend itself to developing renewables resource.
8 Decent Work and Economic Development: studies of the human resources on site indicates that there is great opportunity for both more effective and equitable distribution of work opportunities, but this is complicated.
9 Innovation and Infrastructure: there is scope to see the botanical gardens as a biodiversity resource. Thus far, infrastructures are in poor condition and belong to a historic vision of the gardens. This project contributes to developing a new vision, associated innovative facilities and a consequent "green" infrastructural shift.
10 Reducing Inequalities: the inequalities of civic society are palpable. This project looks to find ways of offering more evenly distributed opportunities.
11 Sustainable Cities and Communities: this project hopes to see the gardens in the local, city-wide, national and international contexts, not only to promote the gardens as a major contributor to Kolkata and Howrah as sustainable cities with more sustainable communities, but also as an international exemplar on how all such gardens might contribute to these aspirations.
12 Sustainable Consumption and Production: although the site is not currently concerned with significant consumption and production, the future possibility of community projects in the gardens might give opportunity to address this goal
13 Action on Climate Change: the project is highly sensitive to the global location of the AJC Bose Gardens as an extension of the Sunderbans and Kolkata's east wetlands. This is both a major issue for the gardens but also a major opportunity for them to adapt and make climate change a central concern of their operations.
14 Healthy Oceans: the water bodies in the gardens have species specific biodiversity concerns that can feed into the various scales of hydro-ecology given the proximity to the Hooghly river, the Bay of Bengal and the Indian Ocean. We foresee the need of an ichthyologist on a future research team.
15 Sustainable Ecosystems: the project envisages the gardens acting as one in a series of sustainable ecosystems within the city.
16 Peace and Justice: Perhaps by shifting its historical role as an institution associated with systems of governance to one of biodiversity resources for the well-being of all communities, the botanical gardens can be an exemplar of a city institution with these goals.
17 Global Partnerships: it is an aspiration that the project forges strong and productive relations between botanical gardens in the UK, specifically the Royal Botanical Gardens Edinburgh in the first instance, but also all botanical gardens in India and internationally across the world and even for the Kolkata Gardens to participate in the Botanical Gardens Conservation International (BGCI). The AJC Bose Gardens might become an international centre for the study of climate change, hence, a centre for developing international civic and academic institutional partners.

Although this CPSP is a relatively small project, we hope it will contribute a great deal of impetus to the REFP. The University of Edinburgh will now be listed among the many partners on the larger project and the CPSP will pave the way for the UoE to become a more substantial partner in helping the REFP come to fruition. It is the hope of the CPSP that the benefits of a garden, a substantial garden, a garden that acts as amenity to all in the city, West Bengal and the community of Botanical Gardens across India and the world can help, if not in the actual delivery of a regeneration project for the gardens, at least the further sensitisation of the ability of such a garden to be a significant means for cooperative civic and urban regeneration.

A front riverside view of the Roxburgh House.

Opposite Page: CPSP reported in a Kolkata daily on 13.08.2021.

Diversity hotspots at garden

ANASUYA BASU

(From left) **Great spotted woodpecker, Indian flapshell turtle and Indian marsh mongoose are some of the animals at the Indian Botanic Garden**

Howrah: Two micro biodiversity hotspots have been identified at the Indian Botanic Garden in Shibpur by a community participation project for the regeneration of the garden.

The project, undertaken by the Botanical Survey of India along with the Asia Scotland Trust (AST) and the Edinburgh University, put the garden under microscope in May and June.

According to the report, two important ecosystems exist in the garden that have the highest biodiversity — areas that have a high overgrowth of trees, plants, weeds and two of the 22 lakes on the premises.

The Acharya Jagadish Chandra Bose Indian Botanic Garden was set up in 1787 as India's first botanic garden and is now known for over 12,000 living plants of Indian and foreign origin that have been collected over the decades. "The role of the botanic garden needs to change from being a museum of species to that of a biodiversity hotspot," said Neeta Das of NSDA — a Calcutta-based architecture firm and one of the local partners of the project.

Wetlands have been known as "biological super systems" as they create large amounts of food and support high levels of biological diversity. "The lakes and their littoral zones (shore areas) were found to be the most biologically diverse regions in the garden," said Das.

Out of the 22 lakes or wetlands in the garden, two — King Lake and Shadir Lake — had the highest number of faunal and floral species, 10 were found to have medium diversity and the rest supported very low diversity.

The other biodiversity hotspot is the naturally regenerated areas in the northern and riverside areas of the garden. "Natural regeneration is the process by which plants that have grown naturally replace plants that have died or been removed. Over time, the growth of natural regeneration re-establishes canopy trees. This process follows natural plant succession patterns and forms habitats for a multitude of fauna species," said Tania Das, a CEPT University alumna who has worked on forest conservation at Jatun Sacha Biological Station, Ecuador. These areas support biodiversity because there is no intervention that creates a safe environment for nesting, hunting and hiding.

One of the pet peeves of the garden authorities has been lack of funds, which hinder maintenance of the garden. "It will require next to no expenses to maintain these hotspots as no interventions are needed here," said Das.

BSI director A.A. Mao agrees that the garden has areas with high biodiversity. "But funds are needed if the garden is to be restored to its previous glory," he said.

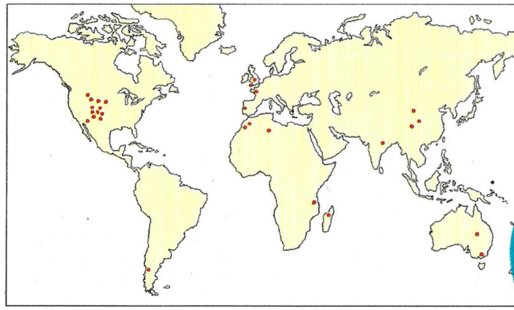
Afterword

Botanic gardens have important roles locally, nationally, and internationally as custodians of biodiversity, advocates for sustainable living, and cherished green spaces promoting human health and well-being. At their heart they hold documented collections of living plants for the purpose of scientific research, conservation, display and education. They conserve threatened species through their ex situ collections, and promote the recovery of wild populations through the application of a deep understanding of their ecological requirements and the active restoration or rehabilitation of damaged habitats. Visitors enjoy and derive great benefit from these gardens as an amenity, particularly those gardens located in cities where they are a green lung in an urban concrete jungle, and a haven from pollution – air, water and noise. But gardens go way beyond this, raising awareness of the twin global issues of our time – the crisis of biodiversity loss and the climate emergency. Botanic gardens are showing the way for people to make the change towards sustainable living, changes that are vital for our own future, and to safeguard our children's future.

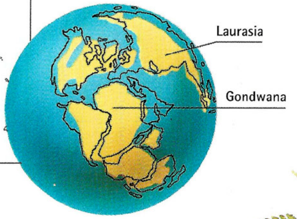
Botanic gardens have had a changing role throughout history, and they continue to adapt and serve the needs of society as new challenges arise. AJC Bose Indian Botanic Garden is one of the earliest botanical gardens in the world, and it too has changed its focus over the two centuries since its foundations. This cycle of change needs to continue, but recent years have seen a reinforcement of plans formed in the past, with little in the way of developments to meet the needs of the present, or consideration of the future. The AJC Bose Indian Botanic Garden has a great potential to be a key player in addressing biodiversity loss and climate change, not just nationally but globally. This study has revealed many opportunities for developing impact in biodiversity conservation and enriching the public experience. The botanic garden and its hinterland is a microcosm of the Kolkata metropolis, and can act as model for urban regeneration focussed on biodiversity and ecology. Improving the biodiversity the garden and addressing pollution in the streams and ponds that flow through the garden, will also improve the quality of lives of local people and open their eyes to these global challenges. More than ever before, the AJC Bose Indian Botanic Garden has the opportunity to demonstrate its relevance and be a leader in offering solutions to the generational challenges of global change which humanity is now facing.

Dr Mark Watson
Head of Major Floras
Royal Botanic Garden Edinburgh

A Sketch indicating the antiquity of the Cycad,
seen in the Botanic Garden.



FOSSIL SITES OF JURASSIC DINOSAURS



MOVING APART
As the two supercontinents moved apart, the centers of dinosaur evolution spread. Most of the plant-eating sauropods, for example, remained in Gondwana, but some theropods, such as *Allosaurus*, spread throughout Laurasia.

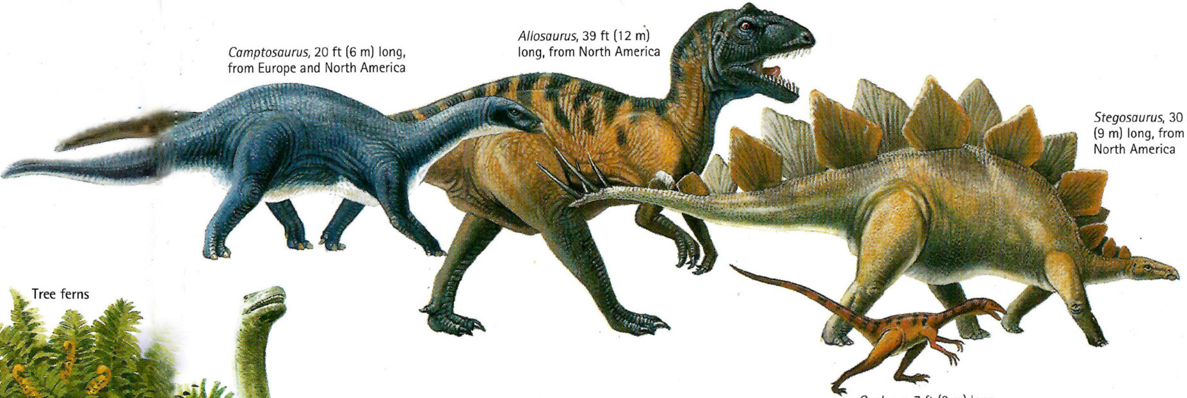
STRANGE BUT TRUE

The forests that covered the Jurassic world survive today—as seams of coal. Dead trees (even whole forests destroyed by storms or floods) were covered by mud and soil. They slowly hardened into material that looks like rock, but burns like wood!

• THE ARRIVAL OF THE DINOSAURS •

The Jurassic World

Toward the end of the Triassic Period, the supercontinent of Pangaea started to divide into two smaller, but still very large, continents—Laurasia and Gondwana. New kinds of dinosaurs began to evolve on these new continents as they moved further apart. The slightly cooler temperatures and higher rainfall of the Jurassic world created a warm, wet climate that was ideal for reptiles. The lizard-hipped dinosaurs continued to break into the two groups that first split in the Triassic Period: the meat-eating theropods, which walked on two legs; and the plant-eating sauropods, which moved on all fours. The bird-hipped dinosaurs remained plant eaters. Giant, long-necked, plant-eating sauropods; plated, bird-hipped dinosaurs such as *Stegosaurus*; and bird-hipped plant eaters such as *Camptosaurus* were some of the mighty dinosaurs roaming the Jurassic world.

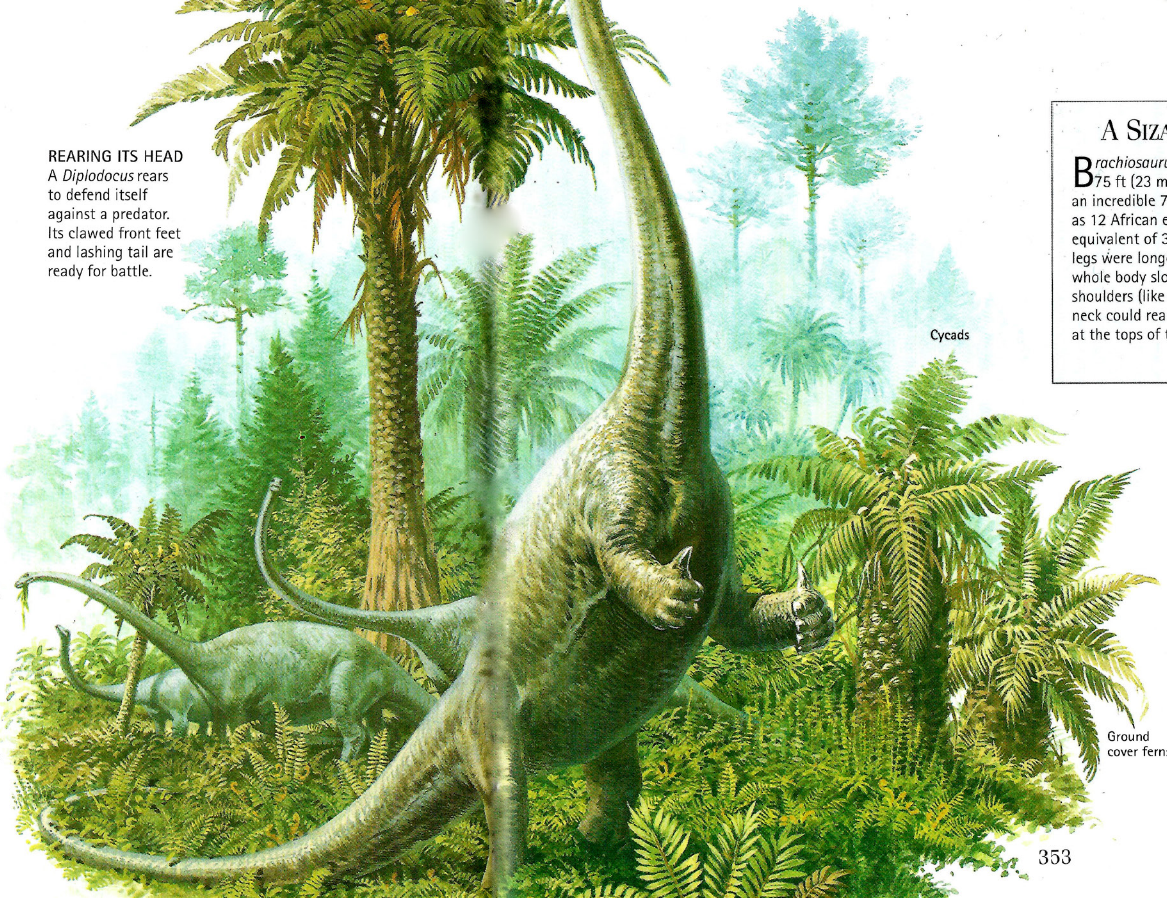


Camptosaurus, 20 ft (6 m) long, from Europe and North America

Allosaurus, 39 ft (12 m) long, from North America

Stegosaurus, 30 ft (9 m) long, from North America

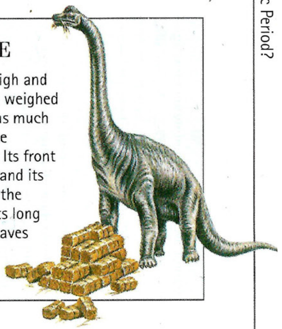
Coelurus, 7 ft (2 m) long, from North America

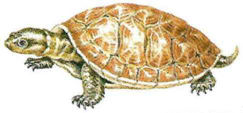


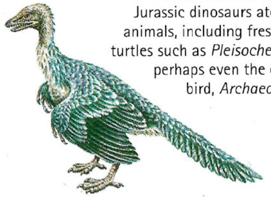
REARING ITS HEAD
A *Diplodocus* rears to defend itself against a predator. Its clawed front feet and lashing tail are ready for battle.

A SIZABLE APPETITE

Brachiosaurus was 39 ft (12 m) high and 75 ft (23 m) from nose to tail. It weighed an incredible 78 tons (80 tonnes)—as much as 12 African elephants—and ate the equivalent of 35 bales of hay a day. Its front legs were longer than its hind legs, and its whole body sloped downward from the shoulders (like a giraffe today), so its long neck could reach the tasty young leaves at the tops of the tallest trees.







FOOD FOR DINOSAURS
Jurassic dinosaurs ate many animals, including freshwater turtles such as *Pleisochelys* and perhaps even the earliest bird, *Archaeopteryx*.

Discover more in Long-necked Dinosaurs

Q: Why were there so many plant-eating dinosaurs in the Jurassic Period?

भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA

THE UNIVERSITY OF EDINBURGH

ANDS

Asia Scotland Trust

AUDA